Promoting Effective Perinatal Care

Essential Antenatal, Perinatal and Postpartum Care

Training modules

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ABSTRACT

Much has changed in antenatal, perinatal and postpartum care in recent decades, and many of the changes have arisen from a questioning – and in some cases discarding – of many of the interventions which had previously been considered appropriate or even essential. The course described in this manual is designed to encourage health professionals and policy-makers to join that questioning process. The specific goals of this workshop are to enhance the understanding, knowledge and skills of health professionals in maternity care and modern principles and practices of sound care in pregnancy, labour and birth and the postpartum period, through better case management and appropriate interventions, while maintaining safety.

The course is designed to be evidence-based, family-centred and multidisciplinary in approach. It is also sensitive to a holistic approach to care, acknowledging the significance of caring for psychological and social as well as biological concerns.

Keywords

PRENATAL CARE
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This manual is a combined and updated version of the following three earlier manuals:

- Midwifery management in high risk pregnancy and delivery (EUR/ICP/FMLY 94 02/PK9);
- Medical management in high risk pregnancies (revised to Management of low- and high risk pregnancies) (EUR/ICP/FMLY 94 02/PK3); and
- Nursing care during pregnancy, intrapartum and perinatal periods (EUR/ICP/FMLY 94 02/PK2).

It is designed to be used in a series of workshops developed for the countries of central and eastern Europe, the newly independent states and the central Asian republics. The series is focused on health providers who serve women during the childbearing and early child-rearing periods and children, in particular the unborn fetus, the newborn, and children through the first years of life. The workshops emphasize selected factors related to health status, health systems and health providers with the aim of reducing maternal and infant mortality and morbidity and promoting family planning.

The overall goal is to promote maternal and infant health and family planning through workshops on current mother and child health and family planning services. The workshops are designed to develop health providers’ professional and managerial capabilities and create awareness among health providers in order to make lasting improvements in the quality and extent of Mother and Child Health (MCH) services for the most vulnerable population groups. These groups are young girls, pregnant women and mothers, and their infants during the first years of life.

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INTRODUCTION

Why this course was developed

Every year, many women die in Europe due to pregnancy- and delivery-related complications. Many of these deaths and related morbidity can be avoided through effective appropriate maternity care and preventive, diagnostic and timely therapeutic interventions.

Goals

The specific goals of this workshop are to enhance health professionals’ understanding and knowledge of and skills in maternity care and modern principles and practices of sound care in pregnancy, labour and birth and the postpartum period, through better case management and appropriate interventions while maintaining safety. Much has changed in recent decades, and many of the changes have arisen from questioning – and in some cases discarding – many interventions which had previously been considered to be appropriate or even essential. This course is designed to encourage health professionals and policy-makers to enter into that questioning process.

This workshop also aims to allow those who care for women in pregnancy, labour and the postnatal period to gain a deeper understanding of such care for women, newborns and their families. Account is taken of the psychological and physiological stresses of pregnancy, labour and parenthood to assist professionals to take appropriate action when faced with pregnancy-related life-threatening situations. This deeper knowledge and understanding will allow them to improve the standard and quality of care they provide. The workshop is designed for obstetricians, midwives, nurses and feldschers who care for childbearing women wherever they practise.

Conduct of the course

The course is designed to promote active, participatory learning based on adult learning methods and principles, and aims to increase the awareness, knowledge, skills and attitudes of health care providers through interprofessional collaboration, group work and plenary sessions.

The material contained in this manual is arranged in modular form and can be adapted to meet the needs of any particular course offered to professionals who care for women during pregnancy, birth and the postpartum period. The content (the specific modules selected for any programme) and duration of the workshop will be determined by the time available, the nature of the participants and the skills of the trainers. In general, it is envisaged that the course will be offered over four to six days and will be directed primarily at obstetricians and midwives or related professionals.

Required reading

Readings with additional material covered during the sessions are also provided for participants, and listed with the module of the course to which they apply. Sometimes participants will be asked to read this before the session; in other instances it can act as a summary.
Required resources and visual aids

The handouts required to accompany sessions have been included with each module. Together with suggested overhead slides to be used with each module, these handouts are also included in a separate folder. Visual aids and handouts may be photocopied for individual use.

Objectives

Depending on the specific modules included in a workshop the following objectives will be achieved on its completion.

Increased knowledge and understanding

Participants will have:

- developed their understanding of the role and responsibilities of the health care provider during pregnancy, birth and after;
- developed an increased awareness of the psychological, biological, cultural and social aspects affecting the antenatal, intrapartum and postpartum periods;
- understood the changing nature of maternity care in developed countries and the ways these services focus on the needs of the users;
- understood the nature and fallibility of diagnostic tests and clinical interventions used in maternity care and the crucial effect that they have on the roles played by professionals;
- been encouraged to examine the scientific basis for their professional practice and to question and challenge their existing policies;
- been encouraged to consider the appropriate design and philosophy underlying clinical practice in maternity and newborn care.

Enhanced diagnostic and clinical skills

Participants will have:

- the know-how to manage the pregnancy and labour of low risk women and ensure that they are different from the management of women at higher risk;
- an understanding of how to determine who is at risk, when, and at risk for what, and an awareness of the need for vigilance regarding all pregnancies;
- recognized the possibility that women may change from low to high risk and vice versa at different times before, during and after labour;
- defined women for whom various interventions in labour, such as induction and Caesarean section, may be more appropriate.

Enhanced managerial skills

Participants will have:

- understood the importance of a team approach to care in which all members of the perinatal care team are equally respected and valued;
- determined protocols for the management of certain categories of complicated labour, for example:
  - fulminating pre-eclampsia or eclampsia
– intra- or postpartum haemorrhage
– dysfunctional progress in labour;

- appreciated the value of locally derived protocols for maternity practice as a means of improving the standards of practice and of increasing the morale and involvement of professionals in their service.

More favourable attitudes
Participants will have:

- an understanding of the modern management of labour and how to be both relaxed and vigilant at the same time;
- an understanding of how to make the experience fulfilling and rewarding for the woman and her family while maintaining safety;
- been encouraged to reflect on practice, initiating a questioning approach to the provision of maternity care in their own area and its ability to meet the needs of women and their families;
- recognized the importance of a genuinely humane approach to care in which the woman and her family are regarded with respect, dignity and confidentiality.

Evaluation
Two types of evaluation are expected. The first will be conducted on a continuing basis throughout the course and the second at the end of the workshop.

Continuing evaluation
At the end of each day of the workshop, you will be asked three questions:

- What were the most significant things learned during the day?
- What happened to stimulate this learning?
- If there was no significant learning experience, why not? What could be done differently?

This evaluation is verbal and is discussed among the participants.

End of workshop evaluation
On the evening of the penultimate day of the workshop you will be asked to complete an anonymous, written evaluation of the workshop. The evaluations will be collected at the end of the final day. The results will be presented to the project coordinators. There will be an opportunity on the final day to express your opinions verbally to the facilitators and colleagues.
PRINCIPLES UNDERLYING THE COURSE

Values and principles for perinatal care in the European context

- Care for normal pregnancy and birth should be demedicalized.
- Care should be based on the use of appropriate technology.
- Care should be regionalized.
- Care should be evidence-based.
- Care should be multidisciplinary.
- Care should be holistic.
- Care should be family-centred.
- Care should be culturally appropriate.
- Care should involve women in decision-making.

Appropriate technology for birth

The following is the text of a paper by Beverley Chalmers (WHO collaborating centre in women’s health, Centre for Research in Women’s Health, University of Toronto, Canada) for the Joint Interregional Conference on Appropriate Technology for Birth, held in Fortaleza, Brazil, from 22 to 26 April 1985.

WHO appropriate technology for birth: Fortaleza and beyond

In 1985, WHO published an article in the *Lancet* entitled “Appropriate technology for birth”. In the same year WHO also published the book *Having a baby in Europe*.

Despite the extensive research, debate and discussion surrounding these publications some readers remained sceptical about the WHO recommendations. Questions were asked about the scientific basis of the recommendations, and whether these were not simply the conclusions of some left-wing, radical and extremist birthing advocates.

A comparison of those WHO recommendations for birth in 1989 with the findings of randomized control trials, as reported in the book *Effective care in pregnancy and childbirth*, (Chalmers I. et al. 1989) has indicated an almost one-to-one correlation between the two.

In 1992, the British journal of obstetrics and gynaecology published a further report entitled “WHO recommendations for birth revisited” (Chalmers B. 1992), in which the following conclusion was reached: “The WHO recommendations for appropriate technology for birth, as developed through survey research, discussion and debate, are strongly endorsed by the findings of carefully controlled, and critically evaluated, randomized control trials.”

Forms of care that should be abandoned include:

- failing to involve women in decisions about their care
- involving doctors in the care of all women
- insisting on universal institutional confinement
- prohibiting siblings from visiting
Principles Underlying the Course

- routine use of gowns and masks in newborn nurseries
- separating healthy mothers and babies
- scheduled breastfeeding
- distribution of free formula samples
- leaving mothers unattended during labour
- routine shaving
- routine enemas
- routine electronic fetal heart monitoring without scalp blood sampling
- restricting maternal position in labour
- routine episiotomy
- routine repeat Caesarean section after a previous Caesarean section
- routine induction at >42 weeks
- routine use of sedatives/tranquillizers.

*Forms of care that should be encouraged include:*

- providing enhanced support for women
- unrestricted mother–infant contact
- an upright labour position
- little benefit from a Caesarean section rate higher than 7% was noted.

Since then a number of developmental programmes have been initiated which have incorporated the WHO recommendations, including the WHO Safe Motherhood Programme and the WHO/UNICEF Baby-Friendly Hospital Initiative (BFHI) on both the global level and the CARAK (Central Asian Republics, Azerbaijan, Kazakhstan) regional/subregional level. City or region-specific programmes have also been developed including, for example, the Canada-WHO-St Petersburg Maternal-Child Health Programme.

Based on the experience on these programmes, the following benchmark for perinatal health care reform is proposed:

This benchmark identifies characteristics of perinatal health systems which have been found to lead to better outcomes, including reduced infant and maternal mortality, patient satisfaction and programme sustainability.

These programmes share a number of values and approaches which include:

- promoting appropriate use of technology in perinatal care;
- endorsing a demedicalized approach to care;
- sensitivity and concern for the psychological needs of the woman and her family during pregnancy, birth and parenthood;
- encouraging a woman-centred approach to care in which the woman becomes the most important person in delivery rather than the attending care givers;
- encouraging skin-to-skin contact at delivery and kangaroo care thereafter, particularly for preterm and sick babies;
- not separating mothers and babies after delivery;
- supporting and promoting breastfeeding, and introducing the Baby-Friendly Hospital Initiative (BFHI);
- introducing more effective methods of infection control;
- providing training in resuscitation;
- providing essential equipment and drug supplies;
- encouraging regionalization of care and referral of the baby in utero rather than postpartum;
- encouraging rooming-in for mothers of preterm and sick babies;
- being concerned about the consequences of improved survival rates of low-birth-weight babies in terms of the increased and special social, psychological, educational and medical care needs of both babies and their parents;
- bringing fathers and other family members into the hospital during labour, delivery and the postpartum period;
- improving access to information and educational materials;
- encouraging a multidisciplinary, team approach to care giving;
- promoting a family-centred approach to all aspects of care.
At the end of this module participants should:

- have an understanding of what this course is designed to do
- have an understanding of the Safe Motherhood Programme
- begin to question the status quo of maternity care in their own countries.

This module analyses the limitations on maternity care that are apparent in all countries as we reach the twenty-first century. It will provide participants with some ideas, which will help to change their maternity care services so that they become modern and effective.

You, as participants or trainers, will be asked to question many of the assumptions that have comfortably surrounded maternity care for decades. In questioning these you will see in how many ways the care we provide fails to meet the needs or aspirations of those we serve: the mothers, the babies and their families.

Many of the mistakes that have been recognized in the last 20–30 years will be discussed. These mistakes have been occurring in many of the countries with (supposedly) the most advanced maternity care systems in the world. We all make mistakes. We will continue to make mistakes. A prediction that we can make with complete confidence is that in 25 years time we will look back on our practice now and be able to identify activities that are misguided and inappropriate. We are, however, obliged to ensure that we constantly analyse our current activity and learn all the available lessons from the past.

There have been astonishing improvements in maternity care during this century. Mothers and their babies are much safer now than a century ago in all. But safety and improved mortality statistics are not the only ways to measure the adequacy of maternity care. The past 20 years have revealed in many countries a growing sense of dissatisfaction. Users are frustrated by the failure of the services to acknowledge the more human side of maternity care provision. Put simply, there has been an increasing feeling that it is no longer acceptable to pretend that pregnancy and childbirth are exclusively medical events, responsive only to medical solutions. Added to this there is a growing realization that much of what has been done in the name of medical safety has at best not been proved to be effective and at worst suspected to be harmful, often for many years.

Many professionals initially believed that malice, hard-line feminist dogma, mischief or other nonspecific unworthy motives inspired these types of criticism. But such a defence is no longer credible – if indeed it ever was. The fact is that all over the world maternity care has been weighed in the balance and found wanting, and the process continues. Despite the recent emphasis on evidence-based medicine in many countries, we find in the late 1990s that there are countries where Caesarean section rates are rising to absurdly high levels (in many cases over 50%), even though these societies have access to modern information and facilities. Such a situation is to the shame of the medical services.

This workshop is designed for use in countries where the basic statistics of maternity care indicate that there is a real problem. Delving beneath these stark statistics we most commonly
find that the overall design of the maternity services is faulty. Usually there is inadequate funding of the services, which is a clear reflection of the overall economic situation in the countries concerned. In addition there are major socioeconomic problems that afflict part or all of the populations, with predictably adverse effects on all aspects of health, not just maternal and infant health.

However, it is all too easy for health professionals to feel that these problems are too big for us to deal with. This is not good enough. There is clearly a moral obligation on us all to do what we can to improve the lot of those we are trained to care for. We may not be able by our efforts to improve the overall economic status of our populations, but we can analyse our activities and ensure that they fit in to what is currently considered to be best practice.

Is there anything particularly unsatisfactory about maternity care? Are we performing any worse than other areas of medicine? Possibly not, but the difference between maternity care and, for example, care of cancer sufferers, lies in the fact that pregnancy is not an illness. It is, therefore, extraordinary that for so long in this century a bizarre belief that the management of pregnancy should proceed along medical lines has been held to be above question. We can now see that this error has led us to create medically based systems to care for a predominantly nonmedical situation. These systems can – and frequently do – act against the best interests of mothers and babies.

This module as well as others in the workshop is designed to address the question of how well you are doing in providing care for your mothers and babies.

In this introductory module we question the idea that all pregnancies need to be cared for in the same way. We introduce the need for evidence-based medicine, and suggest in particular that professionals should constantly ask themselves four questions so as to assess their actions. These are:

- What am I doing?
- Why am I doing it?
- Does it achieve its aim?
- Is there a better/more acceptable way of achieving this aim?

It is now clear that much that is done in all areas of medical practice is not supported by evidence of efficacy. Many actions/interventions are now being carefully analysed and as a result much of what we have been doing is being shown to be unnecessary, wasteful of resources and frequently harmful in some respect or other.

The Safe Motherhood Initiative, which was initiated in 1987, is a worldwide programme aimed at a multiple variety of care providers involved in care during pregnancy, birth and the postpartum period, aimed at stimulating a global effort to reduce maternal mortality by half by the year 2000.

Safe motherhood is not only about avoiding death and morbidity but also about concern for the health of mother and baby. This includes the physical, mental and social wellbeing of the childbearing woman before, during and after childbirth, so as to facilitate the birth of a healthy baby, which will be able to thrive into a healthy childhood. This approach is in keeping with the constitution of the World Health Organization (1948) which defines health as “a state of
complete physical, mental and social wellbeing and not merely the absence of disease or infirmity”.

In 1985, Dr Fatallah in the WHO video “Why did Mrs X die?” suggested that there is a specific road which, if a pregnant woman travels on it, will result in her death (Figure 1). Until recently, care for a pregnant women was aimed at identifying women who had indications of being “at risk” along this road. It is now understood, however, that many of the factors, which may lead to a maternal death, are not always identifiable. A more realistic approach to the provision of pregnancy care is to provide a woman with the necessary care and services to help her stay on the road to health and to remain watchful over the health status of every woman. This is referred to as the primary care approach to maternity care, or the “alternative path”.

Figure 1. The road to maternal death or life

Health care for mother and baby means making the most effective use of material and human resources. Maternal health systems must be strengthened so that they could be able to offer a continuum of care from before conception, through pregnancy and delivery. The *Mother-baby package* defines a set of basic interventions to be applied before and during pregnancy, and during and after delivery. Each element can be applied appropriately at community level, in the health centre or the first referral facility. Only when this continuum of care is provided from the community through to the referral hospital interventions has a significant impact in reducing maternal mortality and morbidity.

The person best equipped to provide community-based, technologically-appropriate and cost-effective care to women during their reproductive lives is the person with midwifery skills who lives in the community alongside the women she treats. Midwives understand women’s concerns and preoccupations. They accompany women through their reproductive lifespan, providing assistance at the birth, then during adolescence, pregnancy and delivery and providing family planning services when needed. Most interventions related to care of the mother and newborn are within the capacity of a person with midwifery skills. Experience shows that upgrading the skills of midwives to enable them to respond to obstetric emergencies can reduce maternal mortality. However, additional support is needed from doctors and obstetricians for the management of certain complications and the provision of surgical interventions. Special skills training in essential obstetric care should be available for these categories of health care providers.

Legislation to support the full use of midwifery skills should be based on the Definition of the Midwife, agreed between WHO, ICM (International Confederation of Midwives) and FIGO (International Federation of Obstetricians and Gynaecologists) over 20 years ago and revised in
1992. It is quite simple: if the education programme is recognized by the government that licenses the midwife to practice, that person is a midwife.

The effect of the International Definition of the Midwife is to acknowledge that different midwifery education programmes exist. More important than the type of preparation for practice offered by any government is the midwives’ competence and ability to act decisively and independently. For these reasons it is vital to ensure that any programme of midwifery education safeguards and promotes the midwives’ ability to conduct most births, to ascertain risk and, where local need dictates, to manage complications of childbirth as they arise (Kwast 1995, Peters 1995, Treffers 1995).

The midwives definition makes it clear that they should be equipped to take responsibility for the full range of women's reproductive health needs, including the management of the life-threatening conditions where this becomes necessary. Local regulation of practice, which inhibits the full range of midwifery skills, should be changed in order to support the delivery of the most comprehensive and effective care to women.

**Safe motherhood strategies**

The Safe Motherhood programme focuses on a number of strategies for health for a mother and her baby before, during and after pregnancy. These include:

- ensuring access to safe water;
- providing tetanus immunization after delivery (where tetanus is a problem locally);
- providing access to appropriate maternity care;
- ensuring the availability of a trained birth attendant;
- providing a clean environment for the birth;
- ensuring ease of referral to specialist care;
- screening women for complications (although this does not save many women); remaining watchful for indicators of complications in all women;
- providing readily available emergency obstetric care;
- educating and informing women about their pregnancy and birth and about warning signs of emergencies, so that they know what to expect and can participate in their own care;
- providing easy access to family planning services;
- setting protocols (guidelines to be followed) for dealing with major problems such as haemorrhage or eclampsia.

It is important for all those who provide maternity care to examine their practice, with a view to reducing mortality and morbidity.

WHO suggests that quality maternity care requires the following:

- adequate provision of community-based services to meet the needs of the woman and her partner and/or family;
a trained midwife as the primary care provider for most deliveries who must be skilled at assessment of, and referral of, women who show signs of developing pregnancy or birth complications;

- an infrastructure in all parts of the country which facilitates prompt referral when needed;

- appropriate systems of support which address the socioeconomic and psychological needs of women and their families;

- provision of a basic education programme for midwives which balances academic credibility with clinical excellence;

- provision of a continuing education programme for all health care professionals which combines clinical excellence with academic credibility;

- real commitment to safe motherhood by midwives and all other members of the health care team; this emphasizes quality care, the necessity for researching new trends in practice, and critical analysis of traditional approaches.

Clearly, WHO sees the midwife as the person who interacts with the woman during childbirth in a very special way as her primary care provider.

The values and general principles for maternal and perinatal care in Europe were drawn up by the Perinatal Care Task Force at its first meeting in Venice in 1998, and have been subsequently promoted, disseminated and implemented throughout the Region at country level (see Box 1 below).

**Box 1. Values and Principles of Perinatal Care**

- Care for normal pregnancy and birth should be demedicalized
- Care should be based on the use of appropriate technology
- Care should be regionalized
- Care should be evidence-based
- Care should be multidisciplinary
- Care should be holistic
- Care should be family-centred
- Care should be culturally appropriate
- Care should involve women in decision-making.

*Perinatal Care Task Force, Venice, 1998*

Demedicalization should be aimed at considering pregnancy as a physiological event rather than a disease – in other words, birth and newborns should not be regarded *a priori* as a problem and a patient, respectively. A non-critical approach to demedicalization should be avoided, and safe demedicalization should always ensure a skilled attendance during pregnancy, at birth and after birth for each birth at each level of care.

Appropriate technologies are defined as methods, procedures, techniques and equipment that are scientifically valid, adapted to local needs and acceptable both to those who use them and to those for whom they are used, and which can be maintained and utilized by the community with resources the community can afford.

Effective and safe maternal and perinatal care should be available at each level of care in an integrated network between the primary (minimal), secondary (intermediary) and tertiary
(intensive) levels of care. This will ensure that regionalization of perinatal care takes the place of the previously centralized, out of date and non-functional system.

Common practices, professional skills, protocols and policies of care should be based on scientific evidence and regularly updated.

All the health professionals involved in perinatal care should be trained to work in strict and open interdisciplinary collaboration.

Maternal and perinatal care should be able to satisfy the physical, emotional and psychosocial needs of mothers, newborns, fathers and families in a holistic approach.

Pregnancy and birth are normal, physiological events, and in order to be implemented, perinatal care interventions have to be centred on the information, motivation and participation of the whole family and local community.

Whenever possible, all the acceptable traditional practices of care should be respected after having been tested for safety and effectiveness. Each intervention in the new initiatives should be evaluated in each national context for its impact on cultural attitudes and an effort should be made to facilitate its acceptance through information and discussion.

Women’s participation in decision-making, implementation of the initiatives and advocacy should be enhanced and encouraged through a global effort to disseminate a global awareness of health and health education.

It is easy to see that the principles discussed above can be used in developing implementation strategies and activities belonging to the three partially overlapping areas of quality of health care (QHC), health system development (HS) and family and community involvement (FCL) (see Box 2 below).

Box 2. The interlocking areas of Quality of Health Care, Health Systems and Family and Community Level
Family and Community Involvement (FCL)

**Quality of health care**

In this area, the approach to implementation should ensure quality standards of health care by providing essential packages of training, monitoring and impact evaluation. Strategies should also ensure the regular provision of essential professional skills, drugs and availability of supplies and equipment with respect to the concepts of appropriate technologies, cost-effective interventions and a holistic approach.

**Health system development**

Implementation of objectives in this area should ensure that health systems are adequately updated and organized at each level of care. Legislative reforms and/or implementation of existing laws should take place where necessary and health systems should be modified accordingly so as to address the health needs of mothers and newborns in a holistic way.

The appropriate strategy emphasizes the role of the primary level of health care, offering a model of regionalized health care in which specific tasks and responsibilities are designed for each level of care. This model ensures continuity of care, based on standards of care for each level and standard criteria for referral of complicated cases.

The availability of the essential package provided by the WHO (including training, supervision and protocols for the correct use of drugs and technology) can also lead to a reduction in costs for the health services. This in turn can lead to improvements in the quality of care, greater patient satisfaction, increased use of the public health services and, in all probability, an overall more cost-effective delivery of health care.

**Family/community level involvement**

The implementation of Safe Motherhood strategies should promote actions to involve families and the community. Communities need to be strengthened and families need to be supported in order to provide the necessary care for mothers and newborns.

To ensure that every pregnant woman has antenatal care is primarily the responsibility of the family and community in which she lives. The woman requires the support of her family and community in seeking care if complications arise during the pregnancy, delivery or postpartum and lactation period. To provide this care, families need information, skills and motivation to try to sustain new practices. They will require social and material support from their community. They will also require support from the health sector in the form of accessible, responsive and friendly services providing a holistic approach (taking into account the physical, emotional and psychosocial needs of women and newborns) to maternal and perinatal care.

We should now consider each of these statements and relate them to the roles of those attending the workshop.

| GROUP WORK |
| Which of the above strategies are used in your practice area to achieve safe motherhood? If some are not, indicate why not. |
| Discuss the nature of the problem facing maternity care systems worldwide. Do you agree with these developments? Do you think they apply to your country? |
MODULE 2.
PROVIDING THE MOST APPROPRIATE
REPRODUCTIVE HEALTH CARE

Introduction

The aim of every obstetrician and midwife is to provide the best possible reproductive health care. Most clinicians decide what is best care by amalgamating knowledge from student days, postgraduate study, published papers and personal clinical experience. Thus most clinicians have amassed knowledge in an ad hoc non-systematic way, which may be biased because of the limited time and the number of journals available for study.

The aim of this module is to assist the participants in:

- determining current best evidence in reproductive health care
- applying this approach to their own practice.

By the end of the module each participant should understand what is meant by the term evidence-based medicine.

- Be aware of the process of practicing evidence-based medicine.
- Know where to find the best evidence.
- Understand what is meant by the terms sensitivity and specificity.
- Be able to appraise critically medical publications.
- Understand why the lack of sensitivity makes risk scoring an unhelpful tool in reproductive health care.
- Appreciate that care should be tailored to the needs of the individual woman.

What is meant by evidence-based medicine?

Evidence-based medicine has been defined by Sackett et al. (2000) as the integration of best research evidence with clinical expertise and patient values.1

Best research evidence is described as that which is clinically relevant. The evidence may be obtained, from basic sciences but usually from patient centred clinical research addressing the following questions:

- What is the accuracy and precision of the diagnostic tests (including clinical examination) used?
- What is the power of the prognostic markers – is the evidence about prognosis valid and if valid, how important is it for the patient you are looking after? (Is the prognosis valid over time and how precise is it?)
- The efficacy and safety of therapeutic, rehabilitative and preventive treatments/regimes.

Clinical expertise is defined as the ability:

- to use ones clinical skills and experience to identify each patient’s health state
- to diagnose the individual risks and benefits of any potential intervention for that patient
Patient values are identified as the unique preferences, concerns and expectations each patient brings to a clinical encounter and which must be integrated into clinical decisions.

**Steps in the practice of evidence-based medicine**

There are five steps in the practice of evidence-based medicine, which are as follows:

1. The need for information must be converted into an answerable question, e.g. in a woman admitted at 38 weeks pregnant convulsing with severe hypertension, the question might be “what is the best treatment for the management of eclampsia?”

2. It is then necessary to track down the best evidence for the management of eclampsia.

3. The next step is to appraise the evidence critically in order to determine its validity (how likely the evidence of the success of the treatment is true and that improvement has not just happened by chance); impact (size of effect) and applicability (usefulness in the clinical practice of the clinician undertaking the appraisal of evidence).

4. The findings of the clinical appraisal must then be linked to the patient’s values.

5. The final step is to evaluate the effectiveness (does the treatment work and how well does it work?) and efficiency (does it work more quickly than other treatments? Is it less expensive than other treatments, i.e. what is the best output for the least input?) of the treatment by auditing practice (see Module 25), making changes if indicated and auditing again.

**What is the best evidence?**

The following table is taken from “Evidence-Based Medicine” by Sackett et al. (2000). It outlines the levels of evidence and the grade of recommendation that should be assigned to published papers. Thus the best evidence (A1a) is that which is obtained from a systematic review of randomized controlled trials and the weakest evidence (C5) is that which is expert opinion without explicit critical appraisal.

<table>
<thead>
<tr>
<th>Grade of Recommendation</th>
<th>Level of Evidence</th>
<th>Therapy/Prevention, Actiology/Harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1a</td>
<td>Systematic Review (with homogeneity) of Randomized Controlled Trials</td>
</tr>
<tr>
<td></td>
<td>1b</td>
<td>Individual Randomized Controlled Trial (with narrow confidence Interval)</td>
</tr>
<tr>
<td></td>
<td>1c</td>
<td>All or none</td>
</tr>
<tr>
<td></td>
<td>2a</td>
<td>Systematic Review (with homogeneity) of cohort studies</td>
</tr>
<tr>
<td>B</td>
<td>2b</td>
<td>Individual cohort study (including low quality RCT; e.g. &lt;80% follow-up)</td>
</tr>
<tr>
<td></td>
<td>2c</td>
<td>“Outcomes” Research</td>
</tr>
<tr>
<td></td>
<td>3a</td>
<td>Systematic Review (with homogeneity) of case-control studies</td>
</tr>
<tr>
<td></td>
<td>3b</td>
<td>Individual Case-Control Study</td>
</tr>
</tbody>
</table>
How to find the best evidence

In the past it has been very difficult to find out what is the best evidence. Textbooks are almost out of date by the time that they are published and the medical literature is unwieldy, disorganized and biased and information doubles every two years. This means that in obstetrics and gynaecology, where 6000 articles are published every year, the dedicated doctor should read 17 articles every day of the year so as not to miss anything of importance. Another problem is that 95% of articles in medical journals fail to reach minimum standards of quality and clinical relevance. So what can a clinician do? The busy obstetrician-gynaecologist has three choices for practising evidence-based medicine (EBM):

2. Using EBM summaries developed by others (ECPC, WHO RHL, EBM journals – eliminates up to 98% of the clinical literature).

What do we mean by sensitivity and specificity?

Sensitivity is the proportion of people with the disease and who have a positive test. \( \frac{a}{a+c} \).

Specificity is the proportion of people free of the disease and who have a negative test. \( \frac{d}{d+b} \).

Positive Predictive Value is the proportion of people with a positive test who have disease. \( \frac{a}{a+b} \).

Negative Predictive Value is the proportion of people with a negative test who are free of disease. \( \frac{d}{d+c} \).

These rather abstract concepts are best illustrated by examples. Imagine that a new test has been invented to detect growth retardation in pregnancy. Before ordering the test the clinician will want to know:

- How good is this test at detecting the women with the problem? – i.e. what is the test’s sensitivity?
- How good is the test at excluding women without the problem? – i.e. what is the test’s specificity?
The test was given to 200 women, of whom 100 had a growth retarded baby. The test detected 90 of the 100 growth retarded babies and also detected 30 of the normal weight babies as being growth retarded. It was thus possible to calculate the sensitivity and specificity of the test. This is calculated as follows:

<table>
<thead>
<tr>
<th>Test suggested growth retardation</th>
<th>Baby is growth retarded</th>
<th>Baby is normal weight</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>30</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Test suggested normal birth weight</td>
<td>10</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

The sensitivity of the test is the number of growth retarded babies detected by the test (90) divided by the actual number of growth retarded babies (100) as a percentage, i.e. 90/100x100. **Sensitivity = 90%**

The specificity of the test is the number of normal weight infants not detected as growth retarded by the test (70) divided by the actual number of normal weight infants (100) as a percentage, i.e. 70/100x100. **Specificity = 70%**

The next question is how good is this test at detecting growth retardation in the clinical setting?

As the test detected 90% of the growth retarded babies, it might be thought to be a very good test to use to detect growth retardation in the general obstetric population. However there were 30 normal weight babies also detected. What must also be considered is the **POSITIVE PREDICTIVE VALUE OF THE TEST** i.e. the number of true growth retarded babies detected by the test (90) divided by the total number of growth retarded babies detected by the test (120) as a percentage, i.e. 90/120x100. **Positive predictive value = 75%**

It is very important to remember that the positive predictive value of a test will vary depending on the size of the group with the problem within the total population being screened. Using the above example – a test with a sensitivity of 90% and a specificity of 70% – imagine that it is now used for screening the general obstetric population where the growth retardation rate is 5%. In a population of 2000 women, it would be expected that 100 women (5%) would have a growth retarded baby. Applying the test to all 2000 women we would find:

<table>
<thead>
<tr>
<th>Test</th>
<th>True occurrence</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Growth retardation</td>
<td>Normal weight</td>
<td>Total</td>
</tr>
<tr>
<td>Growth retardation</td>
<td>90</td>
<td>570</td>
<td>660</td>
</tr>
<tr>
<td>Normal weight</td>
<td>10</td>
<td>1330</td>
<td>1340</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>1900</td>
<td>2000</td>
</tr>
</tbody>
</table>

When applied to the total population – the positive predictive value of the test is now 90/660x100 = 13.6%.
Therefore although the test still has a specificity of 90% and so detects 90% of the low-birth-weight infants, it now detects in addition 570 normal birth weight infants as low-birth-weight infants. This makes it unacceptable as a screening test for growth retardation in the general obstetric population.

**How to appraise medical publications critically**

When reading a medical article it is important to consider the following questions:

- Was the problem addressed relevant, important, easily defined, interesting?
- Was the design of the study scientifically rigorous?
- What type of trial was it (e.g. double blind) or how was the trial designed statistically?
- What attempts were made to ensure that the results had statistical significance?
- How were the results analysed?
- Was the discussion based on the results?
- Is the trial relevant to day-to-day practice? (In other words, is it interesting?)

Now look at the following research paper: *Duley, I. Which anticonvulsant for women with eclampsia? Lancet, 2: 1455–1463 (1995)* – and consider the questions listed above. Which type of research paper is this?

It is only fair to mention that this article has been chosen because it is widely considered to be one of the most important published in obstetric practice for many years. The results of this investigation will have a substantial effect on medical practice worldwide and will result in the saving of large numbers of lives. It is also an exceptionally well-written account of a research trial, which was itself of a quality that was effectively above criticism. There are several lessons to be learned.

Do not worry if this module takes a lot of time. This can be a difficult module if participants are not familiar with the methodology of published research papers. Some participants will be very familiar with this, others will not.

**Why risk scoring in obstetrics had not been successful**

The aims of pregnancy care for the normal mother include:

- to educate, advise, support and reassure the mother-to-be and her family
- to provide preventive measures, e.g. folic acid and other nutritional supplements
- to recognize and deal with minor pregnancy-associated problems
- to screen throughout pregnancy for signs of complications developing
- to refer to appropriate higher levels of care if complications do arise.

Pregnancy and childbirth for most women is straightforward and uncomplicated. This is not true for all women however. A small percentage of women will present at the beginning of pregnancy with some pre-existing condition, e.g. severe anaemia; essential hypertension; severe renal disease etc. and require considerably more care and attention during their pregnancy. These women identify themselves at the beginning of pregnancy as being of high risk of pregnancy
complications. So the obstetrician will be expect to see the woman more often during the antenatal period and will be on the look out for problems arising.

In a small group of women complications will arise during pregnancy completely unexpectedly, sometimes resulting in fetal death or the delivery of a very premature baby. Over the years obstetricians have sought ways of identifying this group of women early with the aim of intervening to prevent the complication occurring. Thus many risk scores have been developed, none of which has worked satisfactorily. The explanation why risk scoring is not efficient in routine perinatal care is given in Section 8 of this module. In all attempts at identifying the apparently healthy women who will go on to develop complications, the predictive value (or, quite often, the specificity) of the test has been so poor that far too many women are diagnosed as being at risk of developing the complication, when they were never going to develop it. On the other hand, every pregnancy has the potential to become complicated so we must always be watchful and alert.

Thus the way forward is not to have a blanket approach that treats everyone the same way, but to develop care for each woman tailored to her individual needs. In this way women will not be subjected to treatments (with resulting iatrogenic complications) that they do not require and the health service will not use scarce resources unnecessarily. The maternity service will then become more effective (only women who require the treatment will receive it) and efficient (only necessary tests, treatments, hospital admissions will be made) and women will be much more satisfied with their care.

**Tailoring care to the needs of the individual**

Modern maternity care is moving towards a holistic approach providing care for the whole woman tailored to her needs. Recent randomized control trial evidence has shown that the pattern of 14 antenatal visits – monthly until 28 weeks, fortnightly until 36 weeks and weekly thereafter – adopted by so many countries is quite unnecessary. Healthy women at the beginning of pregnancy with no obvious complications require only five or six antenatal visits. A midwife or primary care physician working to protocols, agreed with the obstetricians, may provide this care. If complications should arise the protocol is followed and usually the women will require to be transferred to specialized care. Otherwise all her care maybe provided by the primary care team. On the other hand the woman with complications at the outset of pregnancy may require total obstetrician care.
MODULE 3.
ANTENATAL CARE

At the end of this module participants should:

- understand factors which can be detrimental to pregnancy
- understand which factors can influence fertility
- consider the contents of pre-pregnancy check-ups
- know the normal physiological changes which occur in pregnancy
- understand the purpose of antenatal care
- know what should be covered during antenatal care
- know which tests to conduct during antenatal care
- be aware of the need to educate women about emergency obstetric care.

Readings:
Villar, J., Bergsjo P. Scientific basis for the content of routine antenatal care. I. Philosophy, recent studies, and power to eliminate or alleviate adverse maternal outcomes. WHO Reproductive Health Library 1999 Issue 2.

Villar, J., Bergsjo P. Scientific basis for the content of routine antenatal care. II. Power to eliminate or alleviate adverse newborn outcomes; some special conditions and examinations. Reproductive Health Library 1999 Issue 2.


The Birth Plan (St Joseph’s Health Centre, Family Birthing Centre, London, Ontario, Canada).

The ALPHA Scale: The Antenatal Psychosocial Health Assessment Scale (Department of Family and Community Medicine, University of Toronto, Canada).


The aim of antenatal care is to assist the woman to remain healthy and thus aid the health of the unborn baby. Antenatal care should also provide support and guidance to the pregnant woman and her partner or family, to help them in their transition to parenthood. This implies that both care and education are required from care providers.

During this important time the role of the health care worker is to:

- promote health activities;
- prevent ill health;
- provide curative services;
- liaise with other services such as specialist care and antenatal education;
- teach the woman both knowledge and skills regarding her own health care;
become a supportive provider who is approachable and willing to listen to the woman’s needs and to assist with any concerns she or her family may have about the pregnancy, birth or postpartum period.

There are a number of important issues around the provision of antenatal care. These include determining what kind of care should be offered to all women and what is needed by women with difficulties or complications arising during pregnancy or birth. Other issues include the frequency of visits, what should actually be offered in terms of care for the woman at each visit and what screening tests are necessary. Quality of care is important and women’s perceptions of their care should be sought and considered at all stages.

**Aspects of care**

**Pre-pregnancy and inter-pregnancy care**

Too many women make their first antenatal visit with the pregnancy already compromised or at risk from smoking, inappropriate nutrition, ingestion of a variety of drugs, including pharmaceutical preparations, genito-urinary infections, anaemia and poor dental health. All too frequently, their cervical cytology and rubella (German measles) status are unknown. Health promotion must, therefore, begin before pregnancy.

The first 12 weeks of embryonic/fetal life are a period of tremendous cellular organization and development (organogenesis), which even today is not fully understood. By the end of this period, the major anomalies that can affect the fetus are usually already present; the earlier they occur the more profound the damage.

There are many factors in both the environment and the individual that can affect fertility. It is, therefore, worth considering factors external to the man/woman (external variables), factors internal to the couple (internal variables) and factors that can affect both male and female fertility.

Consideration should be given to providing folic acid for potentially pregnant women as well as iron supplements, if these are indicated. Recent evidence has indicated that folic acid reduces the risk of some serious defects of the central nervous system in early pregnancy, including anencephaly and spina bifida. The incidence of these problems has been shown to be reduced by 50% when women take the folic acid supplements (0.4–1.0 mg/day) before getting pregnant and during the first six weeks of pregnancy (equivalent to the first eight weeks of pregnancy dated from the last menstrual flow). Women who have had a fetus with a neural tube defect should be counselled about the increased risk in subsequent pregnancies and offered a folic acid supplement (4 mg/day) if they intend to have another pregnancy.

**Encouraging early antenatal care for all women**

The purpose of antenatal care is to:

- support and encourage psychological adjustment to pregnancy, childbirth, breastfeeding and parenthood;
- promote awareness of the social and psychological components of childbearing and their influences on the family;
- monitor the progress of pregnancy to ensure the health and wellbeing of mother and fetus;
monitor all women for signs of obstetric difficulties through close personal attention and diagnostic tests where essential and indicated;
• recognize deviations from the normal, and treat or refer as required;
• recognize that women who develop warning signs may return to normal following treatment and might not necessarily be continued to be regarded or treated as at risk;
• build a trusting relationship between the woman and her care givers;
• provide the woman with information with which she can make informed decisions;
• actively involve relevant members of the woman’s family or friends in the experience of pregnancy, encouraging the supportive role that they might play and recognizing that they too might need support.

It is accepted that all women should seek antenatal care early in pregnancy. Many do, but there are frequently women who do not present for care until very late in the pregnancy or even in labour itself. Women from culturally marginal groups who have not had the educational opportunities which encourage preventive health care, who do not have adequate access to health care services because of lack of transport and the distance they live from the health care facility, with few financial resources to meet the expectations or requirements of the health care services or providers for payment, with restrictive home situations where other members of the family prohibit attendance at health care services, to name only a few reasons, are less likely to seek appropriate and timely care. A particularly harsh deterrent is the frequent report from women that the care they receive is rude and insensitive to their needs and does not encourage them to return (WHO, Safe Motherhood, World Health Day 1998).

It is the responsibility of the health care service, and often of midwives in particular or community nurses, to seek out these women in their home environments and assist them to obtain the health care they need. If women are unable or unwilling to come to the health services, persistent attempts to reach them must be made. They should not be disregarded as ungrateful, unintelligent or spoiled; rather they should be considered in special need of attention and supportive care. Women who do not seek care at the right time may be at higher risk of developing complications of pregnancy which, because they are undetected at a stage when preventive action could be beneficial, might be of a more serious nature.

Cultural differences between health care providers and some women, particularly language barriers, may deter the latter from seeking care. It is the responsibility of the health care service to seek ways of facilitating such contacts and of providing care with translators or, preferably, offered by a person of the same cultural group. In literate societies, written information in the women’s own language should be developed to provide them with knowledge and skills.

It is totally unacceptable for care to be offered in anything less than the most sincere and sensitive ways to all women from whatever background or with any particular presenting problem. Equitable care for all is a woman’s right with regard to health care, and the quality of such care should not be determined by whether women are affluent, more educated or have friends who can assist them to access health services. It is the responsibility of the health care provider to provide concerned, considerate and sensitive care at all times for all women and their families. Maternity health care services exist to serve the needs of pregnant women, their babies and their families. They are the most important people in the facility.
Calculation of the expected date of delivery

The duration of pregnancy is usually taken to be 40 weeks, with normal labour occurring between 38 and 42 completed weeks of gestation. Issues of premature and prolonged labour, therefore, surround the period before 38 weeks and after 42 weeks. The expected date is awaited with anticipation by the woman, who often becomes very disappointed if delivery does not occur around this date. The typical formula for calculation is nine calendar months, and seven days are added to the first date of the last menstrual period. This assumes that ovulation occurred 14 days after the first day of the last period, and that the last period of bleeding was a true period.

Physiological adaptations to pregnancy

A woman’s body adapts and adjusts to the needs and demands of a growing fetus in remarkable ways. Knowledge of the physiology of pregnancy provides an insight into the foundations and rationale of antenatal education. Table 3.1 provides a summary of the physiological changes and describes the feelings the woman experiences as these changes are taking place.

Table 3.1 Physiological adaptations to pregnancy

<table>
<thead>
<tr>
<th>Areas of the body</th>
<th>Physiological changes</th>
<th>Women’s experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endocrine system. Important because hormonal control affects the woman throughout pregnancy; the most active hormones include:</td>
<td>Human chorionic gonadotrophin</td>
<td>The early rise in this hormone is the basis for many pregnancy tests, and it is thought to be the cause of early pregnancy nausea</td>
</tr>
<tr>
<td>Progesterone: produced by the placenta after 12 weeks of gestation; responsible for development of breast tissue, relaxes smooth muscle all over the body</td>
<td>Estrogen: produced by the placenta after 12 weeks of gestation; suppresses ovulation, inhibits lactation, encourages growth of the breasts, uterus and vagina</td>
<td>Tender breasts, Amenorrhoea (no menstrual period), Uterus grows</td>
</tr>
<tr>
<td>Thyroid-stimulating hormone: stimulates the metabolism through the action of thyroxin</td>
<td>Progesterone: produced by the placenta after 12 weeks of gestation; responsible for development of breast tissue, relaxes smooth muscle all over the body</td>
<td>Tender breasts, Prevents uterine contractions, May lead to varicose veins, constipation or urinary tract infections</td>
</tr>
<tr>
<td>Melanocyte-stimulating hormone: as pregnancy progresses and the pituitary gland enlarges more is produced</td>
<td>Thyroid-stimulating hormone: stimulates the metabolism through the action of thyroxin</td>
<td>Feeling of warmth</td>
</tr>
<tr>
<td>The early rise in this hormone is the basis for many pregnancy tests, and it is thought to be the cause of early pregnancy nausea</td>
<td>Melanocyte-stimulating hormone: as pregnancy progresses and the pituitary gland enlarges more is produced</td>
<td>Darkening of skin pigment, Linea nigra, chloasma and secondary areola of nipples develops</td>
</tr>
<tr>
<td>Metabolism</td>
<td>Increases to meet demands of mother and fetus</td>
<td>Weight gain of about 10–12 kg</td>
</tr>
<tr>
<td>Respiratory system</td>
<td>15–20% increase in demand for oxygen; easier gas exchange; lower ribs flare</td>
<td>Dyspnoea (awareness of breathing) in later pregnancy</td>
</tr>
<tr>
<td>Gastrointestinal system</td>
<td>Whole system relaxes, mainly due to progesterone, although internal organs are squashed by growing uterus</td>
<td>Heartburn, Constipation, May need smaller meals</td>
</tr>
<tr>
<td>Renal system</td>
<td>Increased blood flow to kidneys causes 50% increase in glomerular filtration</td>
<td>Glycosuria (sugar in the urine) can occur</td>
</tr>
<tr>
<td></td>
<td>Action of progesterone causes kinking of the ureters</td>
<td>Urinary tract infection can occur, frequency of micturation due to pressure on the bladder from the growing uterus and fetal head</td>
</tr>
<tr>
<td>Reproductive system</td>
<td>Uterus: thickens and grows from a pelvic organ weighing 70 g to an abdominal organ weighing 1 kg</td>
<td>Changing body image: at 12 weeks, uterine fundus is felt above the pubic bone, at 24 weeks, uterine fundus is palpated above the umbilicus, at 38 weeks, uterus presses on xiphysternum</td>
</tr>
</tbody>
</table>
Cervical canal is filled by operculum, mucous plug or show (lower edge of sternum, in the centre of rib cage)

Vagina: has increased blood supply and estrogen acts on mucous-producing cells Increase in vaginal discharge

Breasts
- Both estrogen and progesterone encourage growth and blood supply increases
- Montgomery’s tubercules become more active and prominent Vascular changes visible, colostrum may be secreted from 16 weeks

Skeletal system
- Progesterone softens the ligaments, which assists in the delivery Can cause back pain, or laudosis (curved spine)

GROUP WORK
Consider the physiological changes that take place in pregnancy and the effect these have on the woman. In what ways can antenatal care monitor the changes and minimize the detrimental effects on the women?

Management of pregnancy

Antenatal care is necessary to observe maternal health and fetal wellbeing. The timing and number of antenatal visits depends on the individual. The traditional regime is monthly from the booking visit to 28 weeks’ gestation, fortnightly to 36 weeks’ gestation and then weekly until delivery. Recent knowledge has led to an understanding that in a normal pregnancy a woman does not need to make so many antenatal visits.

At each visit, the midwife will examine the woman using a systematic approach. Good communication is essential; the woman should be able to communicate how she is feeling and if she has any problems. Her general appearance and demeanour will alert the midwife to recognize a number of complaints such as stress, anxiety, concern, illness, disability or lack of sleep. Careful observation of the woman’s general appearance, her demeanour and the manner in which she communicates can provide vital information and should not be overlooked.

Examinations

There is still some debate about which tests and procedures should be carried out during pregnancy and when these should be done. Recent research has revealed that many tests routinely performed until now have been unnecessary. Unless there is some treatment that can be offered, or some preventive care that would be instituted, tests should not be carried out just to record the results. This thinking has led to a questioning of routine practice and a reduction in the number of unnecessary tests routinely performed during pregnancy. Also, treatment of most disorders during pregnancy should be conducted on an outpatient basis. Removing a woman from her home environment should only be undertaken if absolutely necessary.

Some tests do, however, remain vital during pregnancy.

Blood pressure

Most antenatal regimes require the woman’s blood pressure to be taken at each visit to identify signs of hypertension. Hypertension is only a sign and does not always indicate pre-eclampsia. However, a rise in the diastolic reading to above 90 mmHg or of more than 10 mmHg from the baseline reading taken before the twentieth week of pregnancy may require evaluation and referral to a doctor.
Other tests may include the following:

**Urinalysis**

This should be tested at booking for the presence of bacteria to screen for asymptotic bacteriuria. If a high level of bacteria is found (greater than 100 000 colonies per ml), treatment with a suitable antibiotic is required. It is important to retest the urine for bacteria after completion of the treatment. At subsequent visits the urine should be tested for the presence of protein. The definitive test for proteinuria in pregnancy is determination of total protein excretion in a 24-h urine collection, using a reliable quantitative method (e.g. Esbach’s). This is too complicated to be used for screening therefore a random urine specimen (with clinically significant cut-off 0.3g/l or 1+) could be considered.

**Weight**

Recent findings suggest that there is little value in assessing weight gain at each visit and provide no justification for telling women to restrict their diet in an effort to limit weight gain.

**Fundal height**

The measuring of fundal height has been shown to vary a great deal between individual health workers. Therefore, for these measurements to be of value the same person should record the fundal height at every visit. This is only one of many reasons for promoting continuity of care during pregnancy.

Several studies have shown quite good sensitivity and specificity of fundal height for predicting low birth weight for gestation. The ability to predict low birth weight is not the same as ability to detect growth restriction, but fundal height may be useful as a screening test for further investigation. Abdominal girth measurement has not been adequately evaluated at all (Enkin 2000).

When measuring fundal height, the use of a tape measure has been found to provide more accurate information. The measure should be placed at the tip of the symphysis pubis and should measure the distance from the symphysis pubis to the fundus. In normal singleton pregnancies the measurement in centimetres approximates the gestational age after 24 weeks of pregnancy.

**Abdominal palpation**

The lie and presentation are usually noted at each visit. Towards term (from 36 weeks in the primigravida) the degree of engagement is noted and sometimes a note is made of the actual position of the presenting part, despite importance of such kind of intervention (four Leopold manoeuvres) up to date is out of known value.

**Pelvimetry**

Neither X-ray nor clinical pelvimetry are been shown to predict cephalopelvic disproportion with sufficient accuracy to justify elective Caesarean section with cephalic presentation therefore are out of value for routine antenatal care practice. Cephalopelvic disproportion is best diagnosed by a carefully monitored trial of labour (Enkin 2000).

**Fetal heart/fetal movements**

In the early stages of pregnancy the woman should be asked about the movements of the fetus at each visit, although some women do not feel the baby move until after 16 weeks gestation. Sometimes the woman will be anxious if she feels the baby is not moving as much as she thinks
it should. As pregnancy progresses, listening to the fetal heart becomes possible and the midwife can assure the woman that the fetal heart is heard and is at a normal rate and rhythm.

Doppler ultrasound as a means of assessing the fetal heart appears to have little, if any, effect on pregnancy outcome when used as a screening test in unselected pregnancies (Enkin 1996). On the other hand, research into its use in high risk pregnancies (complicated mainly by fetal growth retardation or maternal high blood pressure) shows that there are fewer stillbirths and neonatal deaths among normally formed babies when Doppler is available to clinicians.

Similar findings have emerged regarding the value of counting fetal movement as a measure of fetal wellbeing. The logic behind this is that a reduction in, or cessation of, fetal movements may precede fetal death by a day or more. Two randomized trials have been undertaken (the larger one involving more than 68 000 women) to assess whether clinical action taken on the basis of fetal movement counting improves fetal outcome. These trials provide no evidence that routine formal fetal movement counting reduces the incidence of intrauterine fetal death in late pregnancy. Routine counting results in more frequent reports of diminished fetal activity, greater use of other techniques of fetal assessment, more frequent antepartum admission to hospital, and an increased use of elective delivery for decreased movement, and thus increased use of resources without compensating benefit.

Routine Doppler imaging and routine fetal movement counting for normal pregnancy is, therefore, not supported by available evidence.

**Legs**

At each visit it is useful to examine the legs for varicosities. Women who stand for long periods or who do heavy manual work may benefit from advice on exercises for their legs. However, the presence of oedema (except severe or rapidly developed swellings of face or lower back) should not be taken as a sign of disease since lower limb oedema is present in the majority, up to 50–80% of normal pregnancies.

**Blood tests**

Blood should be taken early in pregnancy to ascertain the blood group and type, if this is not known. Haemoglobin is estimated at least once during pregnancy, preferably around 32 weeks’ gestation when the haemodynamics are at a peak. Sometimes a repeat estimate is ordered at 36 weeks’ gestation, particularly if the haemoglobin is low.

Studies show that routine iron supplements are not essential in well nourished populations but may be helpful in areas of high anaemia or where malaria is endemic. WHO recommendations for such supplements are: one tablet of 60 mg elemental iron with folic acid 0.5 mg twice a day for at least 90 consecutive days.

It should be noted that the normal haematological adaptations of pregnancy are frequently misinterpreted as evidence of iron deficiency that needs correcting. Routine iron supplements raise and maintain serum ferritin above 10 µg/litre and result in a substantially lower proportion of women with a haemoglobin level below 10 or 10.5 g per cent in late pregnancy. As yet, neither iron or folate supplementation after the first trimester have shown any positive effect on a number of substantive measures of maternal or fetal outcome, including proteinuric hypertension, antepartum haemorrhage, postpartum haemorrhage, maternal infection, preterm birth, low birth weight, stillbirth or neonatal morbidity. Women do not feel any subjective benefit from having their haemoglobin concentration raised. There is also no evidence to support the claim that women
might be in a stronger position to withstand haemorrhage. In fact, the contrary might be true in that women with a low haemoglobin might better withstand a loss of blood due to a higher circulating blood volume. Evidence suggests that except for genuine (severe) anaemia (below 70 g/l), the best reproductive performance is associated with levels of haemoglobin that are traditionally regarded as pathologically low (Chalmers et al. 1996). Unless there is evidence of iron deficiency from other measures, low haemoglobin should not necessarily be regarded as sufficient grounds for routine supplementation.

**Rhesus**

Rhesus factor and antibodies should be checked and preparations made to provide anti-D for Rh negative to non-sensitized women following any procedure/event that could result in feto-maternal transfusion, also on 28th week of gestation and after delivery.

**Ultrasound scans**

Visualization of the fetus to assess fetal wellbeing using an ultrasound scan is possible in some countries, but the equipment is expensive and requires expert skilled technicians. There is no doubt about the value of ultrasound in specific clinical situations such as establishing whether a fetus is alive or dead, estimating gestational age (if performed before 22 weeks of pregnancy), establishing the pattern of fetal growth, localizing the placenta, confirming a suspected multiple pregnancy, assessing amniotic fluid volume in suspected polyhydramnios or oligohydramnios, confirming fetal position and assisting in other procedures such as cervical cerclage or external cephalic version. It may also assist in visualizing fetal malformation, although not always with total accuracy.

More importantly, routine use of scans for all pregnancies has not been shown to be clearly beneficial (Enkin et al. 1996). Research has shown that the benefits expected of routine ultrasound in early pregnancy, such as better gestational age assessment, earlier detection of multiple pregnancies, and detection of clinically unsuspected fetal malformation at a time when termination of pregnancy is possible, have been largely unfulfilled. In this regard a satisfactory inspection of fetal anatomy to detect malformation cannot be performed before 18 weeks, and if an examination of the heart is to be included, examination closer to 22 weeks may be necessary.

Research trials of routine ultrasonography in late pregnancy suggest an increased incidence of antepartum admissions to hospital and of inductions of labour with no improvement in perinatal outcome.

In conclusion, ultrasound equipment can be part of an intensive care area where antenatal services are provided for high risk pregnancies or for referral if problems arise, but they are not recommended for routine surveillance in normal healthy pregnancies.

**Non-stress cardiotocography**

Data available from RCT provide no support for the use of antepartum non-stress cardiotocography as a supplementary test of fetal wellbeing in “high risk” pregnancies. Antepartum cardiotocography is essentially an assessment of immediate fetal condition. Unless evidence emerges to the contrary its clinical use would seem best restricted to situations in which acute fetal hypoxemia may be present e.g. sudden reduction of fetal movements or antepartum haemorrhage (Enkin 2000).
Records
All findings should be recorded on the antenatal records. The records should be accurate and contain the signature of the person making the record so that anyone who may be called upon to examine the woman at a later stage in the pregnancy knows whom they can contact for further information if it should be necessary.

Discussion time
It is important to allocate sufficient time to talk to the woman (and her accompanying family, if any) at every visit. This opportunity should be offered when the woman is dressed and sitting up rather than while she is lying naked or partially covered on an examination bed. It is very difficult, psychologically, for women to address difficult questions to you (such as fears about the baby’s wellbeing, difficulties with their partners or sexual practice issues) when they are in a psychologically disadvantaged position. It is important to offer them an opportunity to ask questions and request assistance when they are comfortable to do so.

Exploring stressful social situations in women’s lives during the pregnancy may help to prevent severe negative outcomes in the postpartum period. Factors such as depression, violence in the home or experience of being abused as a child may contribute to difficulties with the birth or with breastfeeding in addition to postpartum adjustment problems. The care giver who detects these concerns and experiences early in pregnancy may be able to provide more sensitive care during pregnancy and birth and to arrange for referrals for specialist support for those who need it. It is possible that sensitivity to such problems may reduce the incidence of postpartum depression, child abuse and marital disharmony after delivery (ALPHA: Antenatal Psychosocial Health Assessment Scale 1996).

While husbands and partners should be encouraged to attend antenatal visits with their wives it is important to ensure that at least one visit (and opportunity for discussion) is offered to the woman alone in case the source of her problems is a member of her family. The woman may not be free to discuss these problems in the presence of her partner or friends.

Emergency obstetric care
It is most important that antenatal care providers strengthen women’s knowledge about warning signs of complications during pregnancy and ensure that they know where to get help if these occur and have the means (financial, transport, help, communication) to do so if the need arises. While many of these difficulties may seem insurmountable at first, discussing the problem with the family and explaining the reasons for the importance of such help and of seeking it quickly when complications occur may motivate them to find solutions in case of problems arising. Simply giving instructions to the family that emergency action must be taken is not enough; the family needs to understand why action is important and what can go wrong if they do not make the necessary arrangements.

In many situations it may be essential to collaborate with traditional birth attendants who customarily offer primary care in some cultures and in some regions. Doing without such care givers on the grounds that they are unskilled will not change local people’s trust in and reliance on their services. There is a need to cooperate with them, to involve them in the health care service, to educate them about emergency signs and what can be done to help at this time and why and their role in this event, and to ensure their acceptance and support by the health care services. It is tempting to chastise them for errors (especially if these prove fatal or severe) but to
do so will only encourage them to avoid the health care services for even longer when next faced with an emergency. Involving them in the consequences of their care for the women under their care as well as educating them about how to prevent errors will go further towards preventing such disasters in future than excluding them from the service. When used as a form of constructive educational audit, this closer involvement of alternate or peripheral health care providers can be used to strengthen maternity services.

These points, while not universally relevant, do apply in countries where there are high numbers of home deliveries without skilled attendance. At present it is estimated that approximately 47% of all births worldwide take place in such situations (WHO World Health Day, Safe Motherhood 1998).

GROUP WORK
Discuss how well your health care service meets the needs of women who have difficulty in getting access to it. What could you do to improve access to care, as well as to offer good quality care, for women who do not usually seek your assistance.

Prioritizing care in emergency situations

In addition to the need to identify high risk pregnancies, it is also important for a midwife to learn to prioritize care and take action in an emergency.

The term “triage” is widely used to describe prioritization in emergencies. In maternity care triage translates to: mother first, baby second, i.e.:

first, assess the mother’s condition: (A,B,C in English)  
- airway
- breathing
- circulation

second, the fetal condition:
- cardiac activity (fetal heart rate)
- gestational age

Triage is particularly relevant to some of the complications we are looking at during this workshop which may be life-threatening. The foundation stones of effective action are:

- plan first
- implement quickly
- communicate effectively
- act correctly.

Midwives need to be familiar with the prioritizing framework, as part of their role is to take appropriate emergency action when complications arise and to refer without delay to a medical practitioner.

“The midwives’ role is to monitor the high risk condition, implement physician-prescribed care as well as midwife-prescribed interventions to minimize fetal and maternal complications.”
(Carpenito 1992).
Module 3. Reading
Antenatal Psychological Health Assessment (ALPHA)

Antenatal psychological problems may be associated with unfavourable postpartum outcomes. The questions on this form are suggested ways of inquiring about psychological health.

Issues of high concern to the woman, her family or the care giver usually indicate a need for additional support or services. When some concerns are identified, follow-up and/or referral should be considered. Additional information can be obtained from ALPHA Guide*.

*Please consider the sensitivity of this information before sharing it with your care giver.

<table>
<thead>
<tr>
<th>FAMILY FACTORS</th>
<th>CONCERN</th>
<th>COMMENTS/PLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social support (CA, WA, PD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• How does your partner/family feel about your pregnancy?</td>
<td>□ Low</td>
<td>□ Some</td>
</tr>
<tr>
<td>• Who will be helping you when you are home with your baby?</td>
<td></td>
<td></td>
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<tr>
<td>Recent stressful life events (CA, WA, PD, Pi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• What life changes have you experienced this year?</td>
<td>□ Low</td>
<td>□ Some</td>
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<tr>
<td>• What changes are you planning during this pregnancy?</td>
<td></td>
<td></td>
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<tr>
<td>Couple’s relationship (CD, PD, WA, CA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• How would you describe your relationship with your partner?</td>
<td>□ Low</td>
<td>□ Some</td>
</tr>
<tr>
<td>• What do you think your relationship will be like after the birth?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERNAL FACTORS</td>
<td>CONCERN</td>
<td>COMMENTS/PLAN</td>
</tr>
<tr>
<td>Perinatal care (late onset) (WA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• First perinatal visit in third trimester (check records)</td>
<td>□ Low</td>
<td>□ Some</td>
</tr>
<tr>
<td>Perinatal education (refusal or quit) (CA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• What are your plans for perinatal classes?</td>
<td>□ Low</td>
<td>□ Some</td>
</tr>
<tr>
<td>Feeling towards pregnancy after 20 weeks (CA, WA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• How did you feel when you just found out you were pregnant?</td>
<td>□ Low</td>
<td>□ Some</td>
</tr>
<tr>
<td>• How do you feel about it now?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship with parents in childhood (CA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• How did you get along with your parents?</td>
<td>□ Low</td>
<td>□ Some</td>
</tr>
<tr>
<td>• Did you feel loved by your parents?</td>
<td></td>
<td></td>
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<tr>
<td><strong>Self esteem (CA, WA)</strong></td>
<td>Low</td>
<td>Some</td>
</tr>
<tr>
<td>-------------------------</td>
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</tr>
<tr>
<td>• What concerns do you have about becoming/being a mother?</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>History of psychiatric/emotional problems (CA, WA, PD)</strong></th>
<th>Low</th>
<th>Some</th>
<th>High</th>
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<tbody>
<tr>
<td>• Have you ever had emotional problems?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Have you ever seen a psychiatrist or therapist?</td>
<td></td>
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<table>
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<tr>
<th><strong>Depression in the pregnancy (PD)</strong></th>
<th>Low</th>
<th>Some</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>• How has your mood been during this pregnancy?</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>SUBSTANCE USE</strong></th>
<th>Low</th>
<th>Some</th>
<th>High</th>
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<tbody>
<tr>
<td><strong>Alcohol/drug abuse (WA, CA)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• How many drinks of alcohol do you have per week?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Are there times when you drink more than that?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Do you or your partner use recreational drugs?</td>
<td></td>
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<tr>
<td>• Do you or your partner have a problem with alcohol or drugs?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Consider CAGE (Cut down, Annoyed, Guilty, Eye opener)</td>
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<table>
<thead>
<tr>
<th><strong>FAMILY VIOLENCE</strong></th>
<th>Low</th>
<th>Some</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td><strong>Woman or partner experienced or witnessed abuse (physical, emotional, sexual) (CA, WA)</strong></td>
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<tr>
<td>• What was your parents’ relationship like?</td>
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<tr>
<td>• Did your father ever scare or hurt your mother?</td>
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<tr>
<td>• Did your parents ever scare or hurt you?</td>
<td></td>
<td></td>
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<tr>
<td>• Were you ever sexually abused as a child?</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Current or past woman abuse (WA, CA, PD)</strong></th>
<th>Low</th>
<th>Some</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>• How do you and your partner solve arguments?</td>
<td></td>
<td></td>
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<tr>
<td>• Do you ever feel frightened by what your partner says or does?</td>
<td></td>
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<tr>
<td>• Have you ever been hit/pushed/slapped by a partner?</td>
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<tr>
<td>• Has your partner ever humiliated you or psychologically abused you in other way?</td>
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<tr>
<td>• Have you ever been forced to have sex against your will?</td>
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<table>
<thead>
<tr>
<th><strong>Previous child abuse by woman or partner (CA)</strong></th>
<th>Low</th>
<th>Some</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>• Do you/your partner have children not living with you? If so, why?</td>
<td></td>
<td></td>
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<tr>
<td>• Have you ever had involvement with a child protection agency (i.e. Children’s Aid Society)?</td>
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</tbody>
</table>
**Child discipline (CA)**
- How were you disciplined as a child?
- How do you think you will discipline your child?
- How do you deal with your kids at home when they misbehave?

<table>
<thead>
<tr>
<th>Low</th>
<th>Some</th>
<th>High</th>
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</thead>
</table>

Overall, how concerned are you about the psychological health of this woman and her family?

Not at all concerned 1 2 3 4 5 6 7 extremely concerned

**FOLLOW UP PLAN**
- Supportive counselling by provider
- Additional prenatal appointments
- Additional postpartum appointments
- Additional well baby visits
- Public Health referral
- Prenatal education services
- Nutritionist
- Community resources/mother’s group
- Homecare
- Parenting classes/parents’ support
- Addiction treatment programmes
- Smoking cessation resources
- Social worker
- Psychologist/Psychiatrist
- Psychotherapist/marital/family therapist
- Assaulted women’s helpline/shelter/counselling
- Legal advice
- Children’s Aid Society
- Other:
- Other:
- Other:
- Other:

**COMMENTS:**

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

Date Completed __________________ Signature __________________

**Associated postpartum outcomes**

The antenatal factors in the left column have been shown to be associated with the postpartum outcomes listed below. **Bold, Italics** indicates good evidence of association. Regular text indicates fair evidence of association.

CA – Child abuse
CD – Couple Dysfunction
Pi – Physical Illness
PD – Postpartum Depression
WA – Woman Abuse

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Module 3. Reading
Birth Plan

INTRODUCTION

My name is_______________________ My due date is__________________________

My doctor is______________________ My baby’s doctor will be_________________

My support person(s) during labour will be____________________________________

These people will be present for the birth

We would like to have our other children visit: We have attended or are planning to attend:

- during labour
- after I go to the mother-baby unit
- not at all

- prenatal classes
- dad classes
- hospital tour
- sibling tour
- exercise classes

I am part of this research study:

Is there anything you would like us to know about you (i.e. important issues, fears, concerns)?

GETTING TO KNOW YOU...

My goal is:

- to use supportive and comfort measures offered by support person and nurse only
- to use pain medications in addition to supportive and comfort measures
- other, please explain________________________________________________________
**FIRST STAGE OF LABOUR… COPING WITH CONTRACTIONS**

Women have found the following comfort measures helpful when coping with the discomforts associated with contractions. Please check which of the following comfort measures you would like your nurse to offer you during your labour:

- [ ] tub bath/jacuzzi/shower
- [ ] walking
- [ ] hot/cold compresses
- [ ] listen to my own music
- [ ] use the birthing ball
- [ ] use my own “focal” point
- [ ] wear my own clothes/night wear
- [ ] use many pillows (must bring your own)
- [ ] massage
- [ ] use of Nitronox (self-administrated combination of two gases)
- [ ] an epidural
- [ ] other ________________________________

**THE BIRTH OF THE BABY**

Your nurse will help you to find different, comfortable positions during the pushing stage of your labour. Which of the following would you also like to try:

- [ ] use the squatting bar
- [ ] give birth on my side
- [ ] do not want to use stirrups
- [ ] other ________________________________

After my baby is born, I would like to:

- [ ] have ________________________________ cut the umbilical cord
- [ ] have my baby put on my stomach right away
- [ ] have the baby wrapped in a blanket before holding
- [ ] have our own bonnet put on the baby
- [ ] have ________________________________ diaper my baby for the first time
- [ ] have ________________________________ take pictures/video during the birth
- [ ] other ________________________________

**UNEXPECTED LABOUR EVENTS**

If you need more information about any of the following topics, ask your doctor or midwife:

- [ ] external fetal monitoring
- [ ] internal fetal monitoring
- [ ] artificial rupture of membranes
- [ ] induction of labour, use of cervical foley catheter and syntolclon
- [ ] forceps/vacuum extractor
- [ ] episiotomy
- [ ] cesarean birth

36
The obstetrical unit believes in keeping mothers and their babies together 24 hours a day; nursing staff will support and help you care for your baby in your room.

I am planning to:

☑ breastfeed
☑ formula feed

During my stay on the mother-baby unit, I would like to:

☑ have my baby with me all the time
☑ be a part of baby’s examinations (admission and discharge)
☑ by present during any tests my baby may be having (i.e. PKU/TSH heel pick blood test)
☑ have the nurse show me and ____________________ how to do a baby bath
☑ give my baby’s first bath on my own
☑ have __________________ give the first baby bath
☑ have our baby boy circumcised
☑ other ________________________________________________________________

After going home, these people will be helping me:
____________________________________________________________________________________
____________________________________________________________________________________

Additional ideas or comments:
____________________________________________________________________________________
____________________________________________________________________________________

I would appreciate a telephone follow-up call after I go home from the mother-baby unit. (First time moms usually receive a phone call from the public health nurse after they go home):

☑ yes         ☑ no       ☐ undecided

_________________________      Mom’s signature        ☐ Dad’s          ☐ Support person’s signature

Date
Module 3. Reading
Routine ultrasound in early pregnancy
James P. Neilson

Date of most recent substantive amendment: 11 July 1998

Objectives: To assess whether the use of routine (screening) ultrasound in early pregnancy (i.e. before 24 weeks) improves outcome compared with the selective use of ultrasound for specific clinical reasons.

Search strategy: The registry of clinical trials maintained and updated by the Cochrane Pregnancy and Childbirth Group. The CENTAL/CCTR database was searched in July 1998.

Selection criteria: Adequately controlled trials of routine ultrasound imaging in early pregnancy, eight have been identified.

Data collection and analysis: Data have been extracted by the author from published work complemented, where necessary and possible, by obtaining unpublished data from primary researchers.

Main results: Routine ultrasound examination results in earlier detection of multiple pregnancies and reduced rates of induction of labour for “post-term” pregnancy, but there is no evidence that it improves substantive clinical outcomes. Where detection of fetal abnormality was a specific aim of the examination, the number of terminations of pregnancy for fetal anomaly increased.

Conditions: Clinicians, health planners, and pregnant women need to decide if these results justify the expense of providing routine ultrasound examinations in early pregnancy.

Background

Diagnostic ultrasound examination may be employed in a number of specific circumstances during pregnancy such as after clinical complications (e.g. bleeding), or where the fetus is perceived to be at a particularly high risk of malformation or of being inappropriately grown. Because adverse outcome may also occur in pregnancies without clear risk features, assumptions have been made that the routine use of ultrasound in all pregnancies would prove beneficial. Such screening examinations may be planned for early pregnancy; or for late gestation, or for both. The focus of this review is on routine early pregnancy ultrasound and will not discuss late pregnancy screening. The main theoretical advantages of early pregnancy screening are more accurate calculation of gestational age, earlier identification of multiple pregnancies, and diagnosis of non-viable pregnancies and certain fetal malformations. However, the quality of ultrasound imaging is dependent not only on the technical capabilities of the ultrasound equipment but also on the experience and expertise of the operator, and standards are variable. Mistakes certainly occur in the prenatal diagnosis of fetal structural abnormalities (both false positive and false negative), and it is essential that a rigorous assessment of routine ultrasound is achieved before any confident recommendations that, in practice, it does more good than harm.

Objectives

To assess whether routine early pregnancy ultrasound (i.e. its use as a screening technique) influences the diagnosis of fetal malformations and of multiple pregnancies, the role of clinical interventions, and the incidence of adverse fetal outcome (including perinatal death) compared with its selective use (for specific indications).
References

References to studies included in this review

**Alesund (published and unpublished data)**


Satvesen K.A. Routine ultrasonography in utero and development in childhood – a randomized controlled follow-up study [Thesis]. Faculty of Medicine, University of Trondheim, 1993. [8450]


**Helsinki (published data only)**


**London (published data only)**


**Missouri (published data only)**


**Norway (published data only)**


**Radius (published data only)**


**Sweden (published and unpublished data)**


**Trondheim (published data only)**


**Tygerberg (published data only)**


* indicates the major publication for the study

**References to studies awaiting assessment**

**Oxford**

Wald N. Randomized controlled trial of routine dating ultrasound in pregnancy. [4021]

**Ongoing studies**

**Adelaide**

Crowther C.A. Trial to assess whether ultrasound examination at the booking antenatal visit reduces the number of repeat screenings and results in earlier diagnosis of non-viable pregnancy/congenital

**Additional references**

**Neilson 1995**


**Paneth 1998**

Rosendahl 1989


This review should be sited as:


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Intramural sources of support to the review
University of Liverpool
Module 3. Reading
Scientific basis for the content of routine antenatal care

I. Philosophy, recent studies, and power to eliminate or alleviate adverse maternal outcomes
Villar J. and Bergsjo P.

Abstract

Background: Scope and content of antenatal care programmes are ritualistic rather than evidence-based. We wanted to identify elements of antenatal care which are of proven benefit in preventing or ameliorating specific adverse outcomes in the mother bleeding, anemia, pre-eclampsia, sepsis and genito-urinary infection and obstructed labour.

Methods: Review of recent literature, especially randomized controlled trials.

Results and conclusions: Recent trials indicate that fewer routine visits for low risk women do not put pregnancies at increased risk but may lessen patient satisfaction. Bleeding in pregnancy has many causes, none of which can be eliminated through antenatal care. Risk factors can be identified by history taking. Counselling and advice on what to do is the best option. Anaemia in pregnancy is common, especially in developing countries. Routine iron supplementation is not necessary in well nourished populations, but iron and folate should be provided for every pregnant woman in areas of high anaemia prevalence based on circumstantial evidence. Haemoglobin (Hb) determination as a routine test is more important late (around week 30) than early in pregnancy: high Hb is a danger signal. It is uncertain whether early detection of pre-eclampsia will reduce the incidence of eclampsia. Recent trials do not support routine aspirin to prevent pre-eclampsia among low risk women, nor is there evidence that anti-hypertensive treatment of mild pre-eclampsia will prevent more severe disease, but improved detection and care may still lead to better outcome. As to infections, urine culture and dipstick for leucocyte esterase and nitrite with subsequent treatment of positive cases will reduce the risk of pyelonephritis and appears to be cost-effective. Serological screening and treatment of syphilis is inexpensive and cost-effective. Obstructed labour can be anticipated in multiparas based on obstetrical history. Hospital delivery should be secured. Height of nulliparas should be recorded where hospital birth is not routine and a discriminatory level for hospital delivery decided locally. External version of breech lie does reduce the incidence of breech births and cesarean delivery.

Keywords: anemia; antenatal care; bleeding in pregnancy; evidence-based medicine; obstructed labour; pre-eclampsia; urinary infection

(Acta obstetrica gynaecologica Scandinavica, 1997; 76:1-14)

WHO Reproductive Health Library 1999 Issue 2
Module 3. Reading
Scientific basis for the content of routine antenatal care

II. Power to eliminate or alleviate adverse newborn outcomes; some special conditions and examinations
Bergsjo P. and Villar J.

Abstract

Background: There is uncertainty concerning antenatal care as a tool to eliminate or alleviate adverse outcomes in the newborn. We identified congenital conditions, intrauterine infections, intrauterine growth retardation, preterm birth and some specific infectious diseases in the mother with a view to prophylactic and other interventions. The value of some special diagnostic tools is also under discussion.

Methods: Review of recent literature, especially randomized controlled trials and systematic reviews.

Results and conclusions: Genetic abnormalities cannot be prevented after conception, but many of them, and a number of acquired conditions, can be discovered by ultrasonographic and biochemical diagnostics. The advisability of screening must be determined locally for each condition, based on prevalence, treatment options and the legal requirements for abortion. Smoking, excessive alcohol intake, and severe undernutrition cause fetal growth retardation. Interventions to reduce maternal smoking have had limited success.

Protein-energy supplementation only modestly affects birth weight. Routine measurement of uterine height is a good predictor of severe growth retardation and in rural settings of perinatal death. Preterm birth has been linked to ascending infection and subsequent rupture of the membranes. Attempts to eradicate local infections have shown some benefit but results are not convincing yet. Cervical cerclage and betamimetic drugs have little, if any, effect. Claims for reduction of physical strain (>5 hours) at work should be supported. Tuberculosis in the mother should be discovered and treated. Malaria prophylaxis during pregnancy will protect the mother and possibly benefit the fetus. Adequate tetanus immunization of all mothers is a high priority intervention in developing countries. In HIV-positive mothers, Zidovudine ante and perinatally will lower perinatal HIV-transmission significantly. Risk scoring may help identify some women for referral to higher level of care. Routine ultrasonography does not improve the outcome of pregnancy in terms of live births and morbidity, but may influence mortality through discovery and abortion of fetuses with major malformations. One vaginal examination during pregnancy is recommended but no repeat procedure unless medically indicated.

Keywords: antenatal care; congenital malformations; evidence-based medicine; fetus; intrauterine growth retardation; malaria; preterm birth; tuberculosis

(Acta obstetrica gynaecologica Scandinavica, 1997; 7G:15–25)

WHO Reproductive Health Library 1999 Issue 2
Module 3. Reading

WHO antenatal care randomised trial for evaluation of a new model of routine antenatal care

Summary

Background. We undertook a multicentre randomised controlled trial that compared the standard model of antenatal care with eight additional visits, known to be effective in improving maternal or neonatal outcomes and has fewer clinic visits.

Methods. Clinics in Argentina, Cuba, Saudi Arabia, and Thailand were randomly allocated to provide either the new model (27 clinics) or the standard model currently in use (26 clinics). All women presenting for antenatal care at these clinics over an average of 18 months were enrolled. Women enrolled in clinics offering the new model were classified on the basis of obstetric and clinical conditions. Those who did not require further specific assessment or treatment were offered the basic component of the new model, and those deemed at higher risk received the usual care for their conditions; however, all were included in the new-model group for the analyses, which were by intention to treat. The primary outcomes were low birthweight (<2500 g), pre-eclampsia/eclampsia, severe postpartum anaemia (<90 g/l), haemorrhage, and urinary tract infection. There was no assessment of quality of care and an economic evaluation.

Results. Women attending clinics assigned the new model (n=12568) had a median of five visits compared with eight within the standard model (n=11958). More women in the new model than in the standard model were referred to hospital admission, diagnosis, and length of stay were similar. The groups had similar rates of low birthweight (new model 7.6% vs standard model 7.0%), stratified rate differences 0.98 (95% CI 0.01 to 1.92), postpartum anaemia (7.5% vs 8.6%, 0.12), and urinary tract infection (3.9% vs 4.2%, 0.42 [1.68 to 0.86]). For pre-eclampsia/eclampsia the rate was slightly higher in the new model (1.6% vs 1.3%, 0.21 [0.26 to 0.67]). Adjustment by several confounding variables did not modify this pattern. There were negligible differences between groups for several secondary outcomes. Women and providers in both groups were, in general, satisfied with the care received, although some women assigned to the new model expressed concern about the timing of visits. There was no cost difference, and in some settings the new model decreased cost.

Interpretation. Provision of routine antenatal care by the new model seems not to affect maternal and perinatal outcomes. It could be implemented without major resistance from women and providers and may reduce cost.

Lancet 2001; 357: 1551–64

See Commentary page 77.

Introduction

Antenatal care is perhaps the most common routine medical activity. Components of antenatal care and the timing of visits have mostly been introduced without proper scientific evaluation. Although several attempts have been made locally to evaluate the number of antenatal visits and the types and levels of care provision through randomised controlled trials. These have been far too large. As the results of provider and practitioner programmes of the more developed countries with only minor adjustments. However, the care commonly consists of irregularly spaced visits with long waiting time and poor feedback to the women, with little communication between antenatal care clinics and delivery units.

Archib Cochrane wrote in 1973: “By some curious chance, antenatal care has escaped the critical assessment to which most screening procedures have been subjected.” He further recommended that “the reactive atmosphere should be removed and the subject treated like any other medical activity and investigated by randomised controlled trials”.

Specifically, evidence was needed on whether the maintenance of antenatal care that emphasises essential elements of care that have been shown to improve selected pregnancy outcomes is as effective as a traditional
Module 3. Readings

Articles

- 33 clinics agreed to participate and were randomised
- 27 assigned new model of antenatal care
- 26 assigned standard model of antenatal care
- Women asked for consent
- Women not asked for consent
- Women consented
- Women did not consent
- Women received standard care as recommended in the clinic
- Provided information for describing form
- Further assessment or referred for special care
- Received basic component of new programme of antenatal care
- Received standard care as recommended in clinic or elsewhere

Figure 3: Study design
Antenatal-care clinics are the unit of randomisation (double randomisation).

*Women who did not consent to participate in the trial were asked to provide the information needed to complete the describing form for baseline descriptive purposes only.

"Western" type of antenatal care in preventing maternal and fetal morbidity. The costs of such programmes, and care providers' and women's perception of the new antenatal-care model also needed assessment. We present the results of a randomised controlled trial with these aims.

Our primary hypothesis was that a new model of antenatal care based on components shown to improve maternal, perinatal, and neonatal outcomes would be as effective as the traditional package in terms of specified maternal and perinatal endpoints among singleton pregnancies, cost, and acceptability to women and providers.

Methods

Trial design and organisation

The study was a multicentre randomised controlled trial in clinics in Argentina, Cuba, Saudi Arabia, and Thailand. Antenatal-care clinics serving four well-defined geographical areas were randomly assigned to the two programmes of antenatal care figure 1], within each of four study sites and within strata defined on the basis of clinic characteristics, strongly correlated with clinic size.

Country-specific definitions of strata were used to implement the randomisation. For each country, clinics were classified as small, medium, or large. These definitions were based on the number of new patients attending antenatal care per year, type of clinic (free-standing or hospital-associated), and health-care system to which they belonged. There were two large, six medium, and four small clinics in Thailand; two large and 15 small clinics in Argentina; four medium and eight small clinics in Saudi Arabia; and 12 small clinics in Cuba. A detailed description of the rationale and study design has been published elsewhere. This trial was centrally coordinated by the UNDP/UNFPA/WHO/World Bank Special Programme of Research, Development, and Research Training in Human Reproduction, WHO, Geneva, Switzerland. An independent external data and safety monitoring committee reviewed monthly any cases of maternal death, fetal death, or eclampsia. These events were recorded because they are the most serious complications of pregnancy and birth. The committee did not adopt formal stopping rules before the beginning of the trial, but it agreed that any increased rate in the new-model group of more than 20% compared with the standard-model rate for any of the primary outcomes should be specifically considered by the committee. Rules for the withdrawal of study clinics owing to non-adherence to the protocol or very low recruitment rates were also adopted. However, there were no withdrawals among the 35 clinics that agreed to enter the trial.

A detailed protocol was prepared in English and Spanish, supported by the Manual of Operations and the Manual of Clinical Activities (also in English and Spanish), which were used at the clinics and local study offices. A checklist of clinical activities was followed during each visit of women receiving the basic component of the new model of antenatal care (figure 2). All data-collection forms were translated from English into Spanish and Arabic.

The protocol and supplementary documents and the funding for the trial were completed in June 1994. The preparatory phase started during November 1995, and randomisation and staff training in the intervention clinics were started by March 1996. The first woman was enrolled in Thailand, on May 1, 1996, and the last, in Argentina, in April 1998. The completed data file was ready for analysis by September 1999.

Study population

The sites selected for the trial were the province of Khon Kaen (Thailand) and the cities of Havana (Cuba), Jeddah (Saudi Arabia), and Rosario (Argentina). A fifth site was considered during the planning phase of the trial but not included because of the high rate of loss to follow-up during a pilot exercise. The eligibility criteria for clinics were as follows. Each clinic had to be able to provide at least 300 new patients in a period not longer than 24 months. Intervention and control clinics had to be in the same geographical area, but serving distinct neighbourh

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### BASIC ANTENATAL CARE CHECKLIST

**Check the activities carried out where appropriate (boxed boxes) (Use the closest gestational age at the time of visit)**

<table>
<thead>
<tr>
<th>Date</th>
<th>1st Visit</th>
<th>2nd Visit</th>
<th>3rd Visit</th>
<th>4th Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient's name</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic record number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study subject number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIRST VISIT: for all women at first contact with clinic, regardless of gestational age. If first visit later than recommended, carry out all activities up to the time.</td>
<td>Classifying: Fever indicates eligibility for the basic component</td>
<td>Clinical examination</td>
<td>Clinically severe anaemia: haemoglobin test</td>
<td>Obstetric examination: gestational age estimation, uterine height</td>
</tr>
<tr>
<td></td>
<td>Blood pressure</td>
<td>Maternal weight/height</td>
<td>Rapid syphilis test, detection of symptomatic sexually transmitted diseases – treatment</td>
<td>Urine test (multiple dipstick)</td>
</tr>
<tr>
<td></td>
<td>Blood type and Rh status</td>
<td>Tetanus toxoid</td>
<td>Provide iron/folate acid supplementation</td>
<td>Recommendation for emergencies/hotline for emergencies</td>
</tr>
<tr>
<td></td>
<td>Complete antenatal card</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SECOND and SUBSEQUENT VISITS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational age – approximate number of weeks:</td>
<td>26</td>
<td>32</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clinical examination for anaemia</td>
<td>Obstetric examination: gestational age estimation, uterine height, fetal heart rate</td>
<td>Blood pressure</td>
<td>Maternal weight (only women with low weight at first visit)</td>
</tr>
<tr>
<td></td>
<td>Uterine test for protein (only multiparous/women with previous estriol peak)</td>
<td>Provide iron/folate acid supplementation</td>
<td>Recommendation for emergencies</td>
<td>Complete antenatal card</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THIRD VISIT: add</td>
<td>Date:</td>
<td>Haemoglobin test</td>
<td>Tetanus toxoid (second dose)</td>
<td>Instructions for delivery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recommendations for lactation/contraception</td>
<td></td>
</tr>
<tr>
<td>FOURTH VISIT: add</td>
<td>Date:</td>
<td>Detection of breech presentation and referral for external version</td>
<td>Complete ANG card, recommend it be brought to hospital</td>
<td></td>
</tr>
</tbody>
</table>

Staff responsible for antenatal care: Name ____________________________

Signature ____________________________

Figure 2: Antenatal-care checklist included in all medical records of women who attended clinics randomised to the new antenatal-care model and who were considered eligible for the basic component of the model.

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study sites and 17 in the fourth site that were eligible for the study and where the health authorities agreed to let the clinics be included in the trial.

All women attending antenatal care for the first time after the start of the study at each of the selected clinics, irrespective of their duration of gestation, medical or obstetric characteristics, or previous antenatal care, were enrolled in the trial. However, women subsequently found not to be pregnant were excluded from all analyses. Women enrolled for antenatal care at the control clinics followed the standard procedure and delivered at the usual hospitals (figure 1). Women enrolled in the clinics assigned to the new-model group were treated by the new basic component if they were classified as at low risk according to a set of risk factors specified in the classifying form. The remainder received any medically required treatment or were referred if found to need further assessment or treatment. These women delivered at the usual hospital sites.

Trial procedures: The model in the control clinics was the antenatal care currently offered, following guidelines formally recommended by the local health authorities based on the traditional western model. In general, the programme was that women made visits once a month during the first 6 months, one every 2–3 weeks for the next 2 months, and then one every week until delivery. Under ideal circumstances, a woman booking early in pregnancy would have about 12 visits. Clinical activities, urinary tests, urophilia screening, haemoglobin measurement, and blood group typing were done manually.

The new model assigned some women to routine antenatal care on the basis of scientifically evaluated and objective-oriented activities, called the basic component of the new model. These were the women judged not to need further assessment or special care at the time of the first visit according to predefined risk criteria. The others were given the care appropriate to any detected condition or risk factor. Women who refused to receive the basic component of the new model followed the standard prenatal procedures in these clinics (figure 1).

At the first antenatal visit to new-model clinics, women were classified as to whether or not they needed further assessment or special care (eg, referral to a specialised clinic). The classifying form contained four binary responses (yes/no) covering obstetric history (previous stillbirth or neonatal loss, history of three or more consecutive miscarriages, last baby’s birthweight <2500 g or >4000 g; hospital admission for hypertension, pre-eclampsia, or eclampsia in last pregnancy; previous surgery on the reproductive tract), present pregnancy (multiple pregnancy; age <16 years or >40 years; RH(-) isoimmunisation; vaginal bleeding; pelvic pain; diastolic blood pressure 90 mm Hg or more at booking), and general medical conditions (insulin-dependent diabetes mellitus; renal or cardiac disease; known substance abuse, including alcohol; and any other severe medical disease or condition). Women with a positive response to at least one of the questions were not eligible for the basic component of the new model but remained in the intervention group as randomised, receiving the care corresponding to the detected condition.

The use of the classifying form is an integral part of the new model, which had two components (the basic component and further assessment and/or special care) and was not considered an entry criterion to the trial. Therefore, no corresponding form was introduced in the control clinics.

Activities included in the new basic programme fell within three general areas: screening for health conditions likely to increase the risk of specific adverse outcomes; therapeutic interventions known to be beneficial; alerting pregnant women to emergencies and instructing them on appropriate responses. The activities distributed in four visits are presented in figure 2. This checklist was included in the medical records of all women classified for the basic component of the new model in the intervention clinics and followed up by their health-care providers.

Efforts were made to allow the clinics assigned the new model to implement the recommended activities: multiple dipsticks for urine tests were made available to all these clinics in which routine urine culture was not possible; iron and folate acid tablets were provided to those clinics that did not have them available, to be given free of charge to all women.

Implementation of the intervention varied somewhat from site to site. In Thailand, urine volume was recorded only in the medical records, and a haemoglobin test was done at the first visit, which was not in the protocol. In Saudi Arabia, women with negative health assessment were not eligible for the basic component of antenatal care, and routine vaginal examination was not acceptable. In Argentina, some physicians in the new-model clinics requested one ultrasonographic assessment without medical indication, which was not recommended. Also in Argentina, if the woman had not delivered by week 41 of gestation, the next visit took place at the antenatal clinic rather than in the hospital, as required in the protocol, and some physicians in one clinic continued to do urine and diet screening tests, although these were not included in the new protocol.

Compliance with the basic component of the new model was formally assessed by means of the antenatal care clinical checklist (figure 2). The checklist was completed during this assessment both by the main care provider and by direct observation by the trial’s clinic supervisor or an external observer. Therefore, for each woman enrolled in this exercise, two checklists were completed for the same visit. All patients attending one randomly selected day in each new-model clinic were studied. Clinics were not notified in advance. A total of 481 antenatal-care visits were evaluated.

Outcome measures: The primary fetal/neonatal outcome was low birthweight (<2500 g) among singleton births. The primary maternal outcome was maternal morbidity index, defined as the presence of at least one of the following severe conditions for which antenatal care is believed to be effective: pre-eclampsia or eclampsia during pregnancy or within 24 h of delivery (pre-eclampsia defined as hypertension and proteinuria 2+ or more in 24 h or 2+ or more on qualitative examination [dipstick]); severe postpartum haemorrhage (haemoglobin <9 g/dL); and treated urinary-tract infection including pyelonephritis (defined as any episode requiring antibiotic treatment or hospital admission). Several other standard maternal and perinatal events were considered as secondary outcomes.

Economic evaluation: An economic evaluation was undertaken alongside this trial. Data were collected about costs borne by providers and women. Information on the use of services was derived from the trial summary forms. This information was combined with unit costs, estimated in a separate...
Essential Antenatal, Perinatal and Postpartum Care

ARTICLES

costing study, to calculate the total costs of care for each
case of model of care. Health-care providers’ costs per pregnancy
for each woman were calculated as those arising from
visits to outpatient antenatal care, including non-routine
visits, days of inpatient antenatal care, delivery (according
to type of delivery), days of postnatal care, and days of
neonatal specialist care. The costing studies estimated the
unit costs of each of these forms of service used within each
facility used by women in the trial in Cuba and Thailand.
Costs borne by women are those associated with
attendance at outpatient visits and were estimated from a
survey of a sample of women attending participating
clinics. All costs are expressed in US$ at prices on Jan 1,
1998, by use of purchasing power parity weights. Owing to
the differences in the economic circumstances in each
country, estimation of pooled costs for the whole trial was
not appropriate.5

Because funds were limited, costs could be estimated in
detail in all the trial clinics only in Cuba and Thailand.
Full reports of the costing exercises are available from the
Economics researchers (MM, JF-R, GH).

Assessment of women’s and providers’ perception of
care quality
This component aimed to compare the perception of the
quality of antenatal care (particularly satisfaction) and the
reasons behind it, in women attending both types of
care. It also explored the health-care providers’ perception of the two antenatal models.6 Assessment
was organised in two stages. In the first, an ethnographic
approach, including focus groups and in-depth interviews
with healthcare personnel and women was used to assess
the frame of culturally related values in every country. These
findings were incorporated in the second stage (quantitative) which used a standard, closed-ended
questionnaire to all providers of antenatal care (92 in the
new model, 82 in the standard model) in all clinics
participating in the trial and another questionnaire to a
random sample, stratified by clinic, of 790 women in the
new model and 748 in the standard model. Women were
included if they were at 32 or more weeks of gestation
and had at least two antenatal clinic visits before the
interview. All interviews took place during 1997, when
the trial was well established.

Design and randomisation
Sample-size formulae corresponding to a stratified cluster
randomisation design7 were applied to both the low
birthweight outcome and the maternal mortality index,
both expected to occur in about 10% of cases. The
calculation took into account that the design involvedfour sites, with clinics (clusters) within each site randomly
assigned the new or standard model of care. Further
stratification by clinic characteristics was expected to
have a conservative impact on power and was therefore
ignored for this purpose.

With the assumption of a constant number of clinics per
stratum, and clinic sizes taken as 300, 450, or 600
patients attending per year, the sample-size requirements
for the design were calculated with a two-tailed significance level at \( \alpha = 0.05 \) and power 1 - \( \beta = 0.80 \) for three
values of the intervention odds ratio (1.16, 1.18, and
1.20) and for values of the intraclass correlation coefficient (\( \rho \)) that ranged from 0 to 0.02. This range
was based on an estimate of 0.000562 from one of the
study sites. These calculations showed, for example, that
19,987 women in four study sites enrolled in 12 clinics
per site, each clinic recruiting 430 patients, would provide
power of 90% for detection of an intervention odds ratio
of 1.2 in a two-sided test with a level of significance of 5%
if \( \rho \) is 0.001. We chose the value 1.2 as the maximum
value of the odds ratio that would be regarded as
consistent with the conclusion that the new programme is
as effective as the standard programme, taking into
account the presumed increased costs and inconveniences
to women and families associated with the latter. With an
average outcome rate across control group sites of 0-10,
this decision implies that a rise in this rate to about 0.12 is
regarded as substantively important to detect. Sample-
size estimates with an equivalence approach were also
calculated.8 To establish the equivalence with a two-
sided confidence interval within a difference of 0.02 with
a power of 90%, and application of a design effect of 1-45
to account for clustering, about 17,000 women would be
needed.9 Both approaches showed that the target of
20,000 women for the trial provided sufficient power for it
to detect a relevant difference or demonstrate practical
equivalence, as defined above.

Nevertheless, the trial protocol stipulated that the
recruitment period should last at least 1 year to capture
all seasonal variation. We therefore had to estimate recruitment beyond the minimum number required.

The allocation schedule for random assignment of care
to models to clinics was computer generated, including
stratification by study site and clinic characteristics, at
a central location (WHO, Geneva, Switzerland) by the
Statistical Unit of the UNDP/UNFPA/World Bank
Special Programme of Research, Development, and
Research Training in Human Reproduction. The
treatment allocation for each site was kept in Geneva
until the site completed the basic introductory training of study personnel (both in standard-model and
control-model clinics). When local investigators were
ready to implement the training workshops for the staff if
the clinic were assigned the new model, the study
statistician sent the treatment allocation by facsimile
directly to the principal investigator of the selected site.

The data-management system was the standard DMS2
system for microcomputers of the WHO/UNDP Special
Programme of Research, Development, and Research
Training in Human Reproduction. This system consists
of a comprehensive set of software that captures the data
collected in clinics and hospitals into electronic files
according to the WHO Good Clinical Practice guidelines.
Each country’s coordinating unit was responsible for data
transmission and preparation of the country data file, following
the WHO system. Data files were sent to Geneva
regularly to consolidate the data master file and so that
overall monitoring reports could be produced.

The staff responsible for data collection after birth,
which included outcome variables, were unaware of
the group status of women in the study. In addition to
monitoring of possible bias in data routinely collected,
information on inpatient events, partially unrelated
to antenatal care, such as emergency caesarean section and
forceps delivery, was collected.

The data-collection form was validated by the trial
supervisor, who completed a second data-collection form
for all deliveries taking place during one randomly
selected day in each of the study hospitals. This form
was additional to that completed for the study by the
hospital data clerk. Agreement between these two observers
was assessed by the percentage of agreement and the
Kappa statistic adjusted for strata for qualitative variables and
the intraclass correlation coefficient for quantitative
variables. During the trial, 12 women in the new-model
group and 331 women in the standard-model group were
included in this analysis.
Statistical analysis
Baseline tables compared the two study groups with respect to cluster-level and individual-level risk factors. Statistical analyses were by intention to treat and accounted for the within-clinic correlation. However, given the equivalence nature of the trial, efficacy analyses were also done.

The primary unit of inference in this trial is the individual patient, with the unit of randomisation (the clinic) adopted only for practical reasons to facilitate the implementation of the intervention. 95% CI (two-sided) were constructed on the intervention effect odds ratios and also on the intervention effect rate difference. Practical equivalence was defined a priori to exist for the two primary outcomes if the upper limit of the 95% CI was 1.2 or less. We controlled for prognostically important baseline variables by the generalised estimating equations approach. These variables were age (4.29 years, 21 to 30 years, 31 years), previous low birthweight, and multiparity, as well as any variable showing substantial baseline imbalance between the study groups.

Analyses were also done to explore the possibility of effect modification on the primary outcomes involving the strata (country and clinic size) and type of baseline antenatal care, although the power to detect interaction effects was low. Formal inferences (significance tests and 95% CI) were made only for the main analyses of primary outcomes.

Ethics
This trial was approved by the Scientific and Ethical Review Group of the UNDP/UNFPA/WHO/World Bank Special Programme on Research, Development, and Research Training in Human Reproduction, the WHO Secretariat Committee for Research into Human Subjects, and the Institutional Review Board of the individual participating centres and corresponding health authorities of the regions where the trial was implemented.

The informed consent procedure was based on the single-consent design proposed by Zelen. Thus, informed consent was requested only from women attending the antenatal clinics assigned to the new model; women who refused were cared for according to the standard practice in their clinic. However, such women were counted in the intention-to-treat analysis as being assigned to the new-model group. Women attending the standard-model clinics received the protocols recommended in each country, in the best format offered in these clinics, which were updated when necessary to allow satisfactory care. Staff of the standard-group clinics were strongly encouraged to follow the recommended antenatal-care guidelines of their country.

Results
Characteristics of clinics and women
Most of the participating clinics were urban, and all belonged to public-health systems. 39 were part of a polyclinic and 14 were within a hospital. Most clinics were of medium size with 35–50 pregnant women booking per month. Overall, resources available were sufficient for the implementation of adequate, basic, routine, western type of antenatal care. Most of the clinics were able to refer women to other levels of care within the same building. Some were able to admit women in the same facility, although most women in the study sites, except in Thailand, delivered in large hospitals. Physicians (specialists in obstetrics and gynaecology or general practitioners) were available in all clinics for the
provision of antenatal care. In Thailand, clinics had midwives providing basic care and physicians were used for referrals. Half of the clinics had special staff to obtain blood or urine samples, and the other clinics were routinely visited by staff from the central laboratories for samples to be drawn or collected.

Data were obtained from a survey by interviewing staff in all clinics and a random sample of women attending antenatal care in these clinics shortly before randomisation. The distribution of clinic characteristics, location, number of new patients enrolled per month, and resources available were very similar between clinics that were subsequently randomised to the two models in the trial.

Clinics were assigned the new antenatal-care model and 36 the standard model. All 53 clinics completed the trial. There were 24,078 women in the four countries attending the antenatal-care clinics for the first time during the study period; of all of these women were enrolled in the trial. 100 women in the new model (8.8%) and 11958 women in the standard model were found after their first visit not to be pregnant and were excluded from all analyses. Of the remaining women, 12,568 started care in the clinics providing the new model and 11,958 women in clinics assigned the standard model (figure 3). 2.2% of women enrolled in the new model and 2.4% in the standard model were lost to follow-up. The proportion of abortions (spontaneous or induced) was similar in the two study groups. The proportion of women who were not lost to follow-up and had single births but completed the trial without birthweight information was 11% in the new model and 9.7% in the standard model (figure 3). The proportions without data for postpartum anemia were 7.6% and 9.0%, respectively. 164 (35%) women attending clinics assigned the new model refused to participate. These women followed the standard care in the same clinics but were included in the new-model group of the trial for the analysis. Multiple births were excluded from the main analysis.

The professional level of the primary-care provider was similar between the two trial groups within countries and overall. For example, 61.7% of women had antenatal care with an obstetrician/gynecologist in the new-model group compared with 57.1% in the standard model. The respective proportions for general practitioners were 18.9% and 19.9%, and for midwives 19.1% and 18.8%. However, the primary provider varied by country: specialists in obstetrics and gynecology provided most of the antenatal care in Argentina and Cuba, general practitioners provided most of the care in Saudi Arabia, and professional midwives cared for almost all women in Thailand.

The mean duration of gestation at entry to the trial was 16.3 weeks (SD 8.4) in the new model and 16.0 weeks (8.9) in the standard model (table 1). Women enrolled in the two trial groups were similar in terms of demographic and obstetric characteristics. Nevertheless, there were some differences in baseline variables of potential prognostic importance, overall and within single countries. These variables were: smoking during pregnancy, education less than primary, hospital admission in the preceding pregnancy for hypertension or pre-eclampsia/echampsia, any previous surgery on the reproductive tract, and late booking (>28 weeks of gestation) for antenatal care.

The proportion of women in the new model who did not require further assessment or treatment after the first visit as determined by the classifying form was 76.6% (ranging from 69.3% to 83.2% in the four countries). History of low birthweight, previous stillbirth, pre-eclampsia in the preceding pregnancy, surgery of the reproductive tract, vaginal bleeding, and severe medical conditions in the present pregnancy were the most common causes for further action.

The intervention

Overall, women attending clinics assigned the new model of antenatal care visited at least three visits compared with a median of eight (IQR five to 11) in the standard model. In all countries, the number of visits was lower in the new-model than in the standard-model group (figure 4). 47.6% of women had fewer than five visits in the new model compared with 19.6% in the standard model.
ARTICLES

Table 2: Use of referral facilities and hospital admissions

<table>
<thead>
<tr>
<th>Hospital admission</th>
<th>New model (n=107)</th>
<th>Standard model (n=107)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any admission</td>
<td>120 (100.0%)</td>
<td>120 (100.0%)</td>
</tr>
<tr>
<td>Maternal mortality</td>
<td>120 (100.0%)</td>
<td>120 (100.0%)</td>
</tr>
<tr>
<td>Maternal loss</td>
<td>120 (100.0%)</td>
<td>120 (100.0%)</td>
</tr>
<tr>
<td>Maternal complications</td>
<td>120 (100.0%)</td>
<td>120 (100.0%)</td>
</tr>
</tbody>
</table>

Table 3: Primary outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>New model (n=107)</th>
<th>Standard model (n=107)</th>
<th>Standardized ratio difference (95% CI)</th>
<th>Adjusted odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low birthweight (&lt;2500 g)</td>
<td>69/120 (57.5%)</td>
<td>76/120 (63.3%)</td>
<td>-0.08 (-0.16 to 0.01)</td>
<td>0.99 (0.72 to 1.36)</td>
</tr>
<tr>
<td>Preterm low birthweight</td>
<td>16/120 (13.3%)</td>
<td>22/120 (18.3%)</td>
<td>0.03 (0.01 to 0.05)</td>
<td>0.97 (0.62 to 1.53)</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>13/120 (10.8%)</td>
<td>15/120 (12.5%)</td>
<td>0.02 (0.00 to 0.04)</td>
<td>0.96 (0.61 to 1.53)</td>
</tr>
<tr>
<td>Puerperal mortality</td>
<td>1/120 (0.8%)</td>
<td>2/120 (1.7%)</td>
<td>-0.03 (-0.06 to 0.01)</td>
<td>0.97 (0.74 to 1.29)</td>
</tr>
</tbody>
</table>

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Table 5: Subset analysis for primary outcomes according to baseline number of antenatal-care visits

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>New model</th>
<th>Standard model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal</td>
<td>1.10 (0.95 to 1.27)</td>
<td>1.04 (0.88 to 1.22)</td>
</tr>
<tr>
<td>Neonatal</td>
<td>2.87 (1.51 to 5.44)</td>
<td>2.39 (1.28 to 4.47)</td>
</tr>
</tbody>
</table>

The maternal morbidity index occurred in 14.5% of women for the new model and 16.5% for the standard model (stratified summary odds ratio 0.96). During the analysis of the trial, statistically significant qualitative heterogeneity (p = 0.12) among strata was found, mostly related to severe postpartum anaemia. Although this index was one of the two primary outcomes selected in the protocol, it was judged that further analysis on an overall basis was inappropriate. The three components of the index were therefore analyzed separately.

The rates of severe postpartum anaemia (no p value owing to heterogeneity) and uterine-tract infections (p = 0.09) were similar in the new model and the standard model. However, the rate of severe postpartum anaemia was substantially lower in the new model (0.6%) than in the standard model (13.3%). For Argentina, the largest difference in iron supplementation was achieved. Sensitivity analysis excluding data from Argentina suggested that the observed heterogeneity in postpartum anaemia was mostly related to the large protective effect of the new model in this study site. For pre-eclampsia/eclampsia, the rate was slightly higher in the new model. (p = 0.63).
Typical cost

- **Premature cost:**
  - Cuba: 2870
  - Thailand: 2078

- **Women's out-of-pocket costs:**
  - Cuba: 170
  - Thailand: 200

- **Women's out-of-pocket costs:**
  - Cuba: 242.4
  - Thailand: 220

Table 6: Costs to providers and women in Cuba and Thailand

Women enrolled in the study who had the highest

**Costs of health-care provided and women**

Table 6 shows costs for women in two countries where detailed information was available. Average providers' costs per pregnancy reflect both the number of uses of the services and the unit costs of each type of service. Costs per pregnancy were higher in the standard-model clinics than in the clinics offered at the new model of antenatal care. The differences between the models in the mean providers' cost and in the women's out-of-pocket costs were significant at *p*<0.05 in Thailand and at *p*<0.01 in Cuba. Typically, less than 25% of average costs to providers are variable in the short term, and these costs can be taken as a proxy for marginal costs. These variable costs were lower for the new-model than for standard-model clinics in all countries, with reductions in median costs of between 6% and 17%. The mean difference in variable costs was significant at *p*<0.01 in Thailand but was not significant in Cuba (p>0.1).

The costs per pregnancy in each country were distributed differently between outpatient and inpatient antenatal care, parturition, and neonatal care. There were differences between countries, especially in the costs of neonatal care. In Cuba, costs for neonatal care were high, accounting for over 20% of the total. In Thailand, lower babies were referred for neonatal intensive care, for a shorter time, and at lower average cost per day. Neonatal-care costs were less than 5% of the total. The costs of outpatient antenatal care formed the highest proportion of cost, but this proportion was less in the new model. The amount of time women in the new-model clinics spent during their pregnancies in increasing care was significantly lower in the new model than in the standard model in the two countries (Table 6, p<0.05).

**Women's and providers' perception of antenatal care**

In the qualitative study, variations in women's general ideas about pregnancy and their views and previous experiences of care underlie the opinions they expressed. For health services and providers, the most important aim of categorisation was modern versus traditional. Antenatal services were generally seen as very satisfactory but some concerns were raised—for example, anxieties originated in changes in the standard patterns of care, especially the number and spacing of visits, the need to improve the way staff treat women, and the need to obtain better information about issues such as nutrition and personal health.

providers, on the other hand, showed strong country-specific views, both positive and negative. In general, although doctors were not opposed to the changes, they were keen to make sure that modifications in the model did not limit their clinical control. In the countries with the largest reduction in the number of visits between the standard model and the new model, doctors expressed satisfaction because they believed that this allowed them to reduce paperwork and allow them to spend more time with their patients.
The subsample of women in the quantitative study was representative of the general population of enrolled women. However, the former had an average slight advantage: the duration of gestation at the first visit was lower (32.7 ± 16.2 weeks) and a smaller proportion had had a previous low-birthweight baby (4.6% vs. 5.8%). The requirements of two previous visits and 32 weeks or more of gestation as inclusion criteria for the survey could account for these differences. Women surveyed were similar between the new-model and standard-model groups in terms of baseline variables.

Women in both groups of the trial expressed high satisfaction with their care, as assessed by a direct question about their satisfaction and two indirect questions ("Would you come back to this clinic?" "Would you recommend it?). However, women in the new model were less satisfied with the number and spacing of visits than women in the standard model. On the other hand, more women in the new model considered that the time spent with doctors or midwives was about right. Women were more satisfied with the information received from providers (table 7).

About two thirds of providers were satisfied with the number of visits they offered, in both models. More than those in the new-model clinics than in the standard model, clinics said that the time they spent with women at each visit was right and were more satisfied with the information received from providers (table 7).

**Discussion**

For both live births and uterine-tract infections, there was a strong indication that the two models are equivalent; the upper limit of the 95% CI for the adjusted odds ratios was below the equivalent limit (1.29) prespecified in the protocol. For pre-eclampsia, the rates were clinically similar, but an increase in risk of up to 56% cannot be ruled out. For severe postpartum anaemia, there was a large protective effect of the new model in the country with the largest increment in the provision of iron supplementation. Secondary outcomes suggest no clinically important differences between the care models.

We used a cluster-randomised design, with a sample size providing sufficient power to demonstrate practical equivalence for the primary outcomes. Cluster randomisation has been used in perinatal and HIV/AIDS trials in less and more developed countries. All analyses accounted for the within-clinic correlation that would invalidate the application of standard statistical methods. We used Zelen's single-sample design as adapted to cluster-randomisation trials. For such trials, published methods have been published, but this design is appealing for trials that assess interventions at clinic level rather than for therapeutic trials.

The four trial centres differed socioculturally and economically. The baseline antenatal care offered in the clinics ranged from a pragmatic adaptation of recommended women routine visits, common in developing countries' urban health facilities and in public health services in more developed countries, to almost ideal antenatal care of the standard in the more developed countries. These diversities provide good external validity to the trial.

We did not use mortality as primary outcome. This endpoint requires an unreasonably large number of participants, but there is pathophysiological support for the endpoints pre-eclampsia and eclampsia, infection, and severe anaemia to be considered as in the causal pathway to the need for intensive care, near-miss, and maternal death.52

We disentangled the morbidity index, for which we had a formal hypothesis of equivalence, because we found heterogeneity of the intervention effect across strata. Combined indices have been suggested for use in trials when modest improvement or equivalence in rare outcomes is expected; in our trial, the different mechanisms and effectiveness of treatments made the use of the maternal morbidity index unsatisfactory. After disentangling the index, we could detect equivalence only for urinary-tract infection. For pre-eclampsia/eclampsia, of the three statistical methods used to compare rates between models, the differences were not significant by two: the adjusted odds ratio, which provides the narrowest 95% CI, was only marginally significant. The increase in the risk of pre-eclampsia in the new model could be in absolute terms, with 95% confidence, at most 0-67% (table 3).

Although the new model may have missed more cases of hypertension than subsequently developed into pre-eclampsia than the standard model, we believe that this possibility is unlikely. Urine protein tests were done on all women, at all visits, in the new model, whereas in the standard model they were done only at the first visit and on women with hypertension. Therefore, there may have been more likelihood of detection in the new model. Furthermore, if there were more cases of undiagnosed pre-eclampsia in the new model, a higher rate of related complications, such as eclampsia, hypertension with severe and treatment, and hospital admissions for pre-eclampsia could have been expected, but this was not the case.

The definition of urinary-tract infection was intended to capture only severe cases, but the high rates observed, particularly in two study sites, could be related not only to the high risk of these populations but also to detection and treatment of less severe cases.

The intervention was largely implemented as planned, including the initial selection of women for the basic component of the new model. This simple tool identified 20% of women requiring a higher level of care on the basis of history or present complications. The objective of this selection was to call attention to conditions or diseases that may need further assessment or follow-up at a different level of care. The classifying procedure was not a risk score, because each disease or condition was assessed independently, and we did not produce a global risk estimate. Furthermore, it includes elements of history, medical conditions, and obstetric characteristics, most of them present at the time of the first examination. Women with a diagnosis of any of these disorders qualified automatically for further assessment or treatment for that particular condition, not necessarily related to the frequency or content of routine antenatal care (eg, nutritional interventions). The prediction of intrapartum events was not considered because the objective in this evaluation was to assess the type of antenatal care. The reduction in the number of visits in the new model compared with the standard model was large and clinically relevant, with one study site halving the number of visits. The basic component of the new model is the set of effective, goal-oriented activities implemented on a four-visit schedule. There were, however, recommended activities of the new model that were not fully implemented. An example is external cephalic version, an effective intervention to reduce the rates of breech presentation and caesarean section.53 However, information on effectiveness clearly is not sufficient to change clinical practice. Furthermore, recommendations
to women for emergency situations were reported by women less often than the protocol dictated, although providers reported that they were implementing the Clinicians and midwives may require special training and motivation to include these activities in their routine, or perhaps they should be given by other staff. More women in the new model were referred for higher levels of care, perhaps reflecting concern of clinicians about the longer time between visits. This over-referral did not result in an increase in hospital admissions, and the rate of undiagnosed disorders at hospital or at labour admission was not increased in the new model.

Routine iron supplementation was provided before the trial in three study sites to most women. In the other sites, the supplementation, free of charge to women in the new model, accorded with the well-known protective effect of this intervention against anemia. Perhaps more importantly, it had long-lasting action on haemoglobin concentrations up to the termination cases of pregnancy.

We did not have any formal mechanism to assess compliance of the standard programme with national guidelines. The specimen collection was conducted in the best way services allowed, and that availability of services was not a major limitation for a pragmatic implementation of a western type of antenatal care. This is an important assumption in an equivalence trial, if the standard model was not implemented in required.

We could not pool data for the economic analysis owing to the difference in the economic circumstances in each country, and we investigated costs in detail in only two countries. In both, there was a trend to lower costs with the new model. Results of similar studies in the other two countries do not contradict these findings. Although 10% is too high a level of statistical significance for clinical decisions, two further factors are relevant. First, large sample sizes are known to be needed to detect differences in economic evaluations. Second, Briggs and Fenn have argued that the appropriate level of acceptable error may vary between laboratory area, type of intervention, and decision-makers' thresholds in health economics.

There was, overall, high satisfaction among women in both groups. However, women in the new-model clinics showed some concern about the number of visits being too few and the spacing between them too long. In the opposite direction, but consistent with the components of the new model, women were more satisfied with the information received than those in the control clinics.

The assessment of implementation varied from positive opposition to the new model of care. Similar studies have shown how the treatment of advantages and disadvantages of new schedules, both to women and to themselves. There was an interesting mismatch between the perception of women and providers in relation to information. For example, providers gave themselves higher scores than their patients in relation to the information they provided.

There have been four published randomized trials comparing the effectiveness of routine antenatal-care models with reduced number of visits including some degree of goal-oriented activities. Three of these trials were of good methodological quality with small or moderate risk of bias. As in our trial, masking of care providers and women was not possible, and the problem of treatment “contamination” in all trials is likely. This effect could explain the small reduction in the number of visits (two visits for two women in three developed countries). Overall, evidence from published trials in settings with established obstetrics services shows that small reductions in the number of visits are compatible with good perinatal outcomes; this conclusion is supported by the results of both this trial from Zimbabwe and our trial. The subset analyses from our trial including only the study site with baseline antenatal care similar to that of more developed countries, and with the largest reduction in the number of visits, is reassuring that harm is unlikely.

The rate of pre-eclampsia or pregnancy-induced hypertension in all previous trials was consistently lower in the new-model group than in the standard group. Although we did not observe such a protective effect for pre-eclampsia, the rate of pregnancy-induced hypertension was lower in the new than in the standard model. This effect on hypertension alone may reflect a lower diagnosis rate because of fewer visits, rather than a preventive effect of the new model. The similar rates of pre-eclampsia and other related outcomes in our trial suggest no detrimental effect of these "missed" cases of pregnancy-induced hypertension. Our finding on the lack of effect on the rate of low birthweight is similar to those in previous trials, and suggests that changes in antenatal-care schedule have little effect on this outcome.

There was evidence of heterogeneity of results among the previously published trials for protein delivery. In the three trials done in more developed countries, there was a tendency towards an increased risk with the new model, whereas the trial in a developing country showed a significantly lower rate of protein delivery in the new model. This promising result is not supported by our trial. Only one of the previous trials reported the economic impact of the reduction of two antenatal-care visits. Unfortunately, that evaluation did not include the cost to women, each traveled, child care, or working time loss. There was a small reduction in the antenatal cost to the providers in the new model. However, because there was a non-significant increase in the rate of admission of neonates to intensive-care units, the saving was offset.

Most of the women in both groups of our trial would recommend the clinic that they attended to friends or would use it themselves during another pregnancy. The overall high satisfaction in both groups can be related to the expected-response bias commonly observed when these types of questionnaires are administered to women in health premises. As in the previous trials, more women in the new model said that the number of visits was too small and the spacing between them too long, which confirms that under different cultural situations, some women are concerned about these reduced models. This concern could be related to women's expectations and their negative attitude to change, as well as to a desire to be answered by health professionals that the pregnancy is progressing well. Women responded positively when asked whether they would recommend the intervention clinic to friends or would use it again, which suggests that any dissatisfaction would not persist after they had experienced the new model or if the new model became a norm. A follow-up study of women enrolled in a previous trial reassuringly did not show any negative long-term effect. Nevertheless, if the new model is to be adopted, women need to be well informed about its safety.

Our trial showed that for women without previous or current complications, a reduction in the number of visits including goal-oriented, effective activities is not associated with increased risk for them or their infants. Efforts should be concentrated on implementing only activities with scientifically demonstrated efficacy.
For less developed countries, the goal should be to extend coverage to pregnant women with packages shown to be effective and to avoid setting unrealistic goals. All the activities of the basic component should always be available to all women, as well as the special care for women with complications or emergencies, if comparable results are expected. Furthermore, the new model should be supplemented with other activities that women know to be effective that may be relevant only to some populations (e.g., malaria programmes). For more developed countries, each activity included in the routine antenatal care should be scrutinised or tested for evidence of its effectiveness before being retained in the standard model. If this strategy is systematically applied, a simpler model with a reduced number of visits will be identified. There is ample evidence now that the risk of harm to women and their pregnancies is unlikely.

Finally, the new model is in general accepted by users and providers, does not increase cost, and in some settings decreases cost. Although providers are unlikely to achieve actual cost savings, resources such as staff and buildings, and the time of women and families, will be freed to extend the service to more effective care provision or other activities.

References


3. Villar, J. Khan: Modelling: A. Patterns of antenatal care for less...
MODULE 4.
THE CONCEPT OF RISK

At the end of this module participants should be able to:

- recognize that classifying women into low, moderate or high risk categories does not work; risk cannot be predicted with any accuracy;
- recognize that all pregnancies should be cared for vigilantly;
- know the traditional characteristics of pregnancies which might indicate that they require careful watching;
- critically assess the design of their antenatal care, in terms of both facilities and personnel;
- attempt to incorporate definitions of common pregnancy complications which recognize issues of sensitivity and specificity and can therefore be translated into clinical relevance;
- be able to prioritize care in emergencies.

New approaches to understanding risk in pregnancy

In 1978 the WHO had developed the “risk approach” concept as a managerial tool for maternal and child health care, in particular for countries where access to medical care was limited. However, because there are high levels of false positive and false negative results the approach was not successful as a public health measure. It should be emphasized that there is very little factual evidence that antenatal care does reduce maternal mortality (Bergsjo P., Safe Motherhood Strategies: a Review of the Evidence 2001).

There are new approaches to understanding risk which provide a more liberal approach to care during pregnancies. The traditional methods of classifying women as low risk, moderate risk and high risk have been shown to be ineffective means of predicting complications in pregnancy or birth. Clinicians will readily admit that women with previous histories of complications may go on to have normal pregnancy and birth experiences while the apparently normal low risk woman may develop severe complications with little warning. Risk scoring systems have resulted in overloading of higher level care facilities with unnecessary referrals while women who develop complications are frequently missed for referral to tertiary level care.

Traditional risk scoring systems are therefore no longer recommended by WHO. Instead an approach of vigilance for all pregnant women is being advocated. This does not mean that all women are to be regarded as “high risk”. Rather all women should be considered as having normal pregnancies until there is clear evidence to the contrary. Even so, once some complication is diagnosed this should be carefully considered and questioned as to the extent and severity of the risk it poses for the woman and her baby. For example, some complications may result in temporary risk with a later return to normal. Others may be risky for the fetus or mother at some stage but not at other times. Just what the specific complication means for mother and baby should be defined accurately rather than be classified in some all encompassing risk category.

First, we need to define the criteria for management of normal pregnancies. Review of the medical literature indicates that there is definitely scope for reducing the number of antenatal visits during pregnancy to as few as 3–5 for normal pregnancies and for altering the professional seen from the more highly trained (and therefore more expensive) obstetrician to the midwife or
family doctor. There is increasing evidence that to apply a medical model of care to all pregnant women and/or women in labour is disadvantageous. In addition, where medical resources are scarce it is prudent to restrict their use to those who demonstrably need them.

Second, we look at the specifics of managing labour in normal pregnancies. This is a necessary preamble to specifying care in pregnancies when complications have been identified.

The aims of pregnancy care for the normal mother include:

- to educate, advise, support and reassure the mother-to-be and her family
- to provide preventive measures e.g. folic acid and other nutritional supplements
- to screen throughout pregnancy for signs of change to high risk
- to refer to appropriate higher levels of care if problems arise
- to recognize and deal with minor pregnancy-associated problems.

The most important feature of this module is that it makes clear that many of the practices that have been developed in the care of normal labour are at best of little or no use, and at worst are disadvantageous to women and their babies. These include, inter alia, such practices as shaving the pubic or perineal area, routine enemas, routine episiotomies, routine electronic fetal heart rate monitoring, routine ultrasound, routine use of a horizontal position for delivery, leaving mothers alone for large parts of their labour, not giving emotional support to women during labour and birth, and not involving women in decision-making about their care (Enkin 1996).

It is important to be aware that the same mistakes have been made in virtually every country in the world over the course of the twentieth century. The introduction of medical interventions into the natural process of labour was rarely questioned, such was the confidence that there could be no adverse consequences of acting in this way. It is only as we reach the end of the century that we better appreciate the fallacies contained here. The challenge to all health care professionals is how to ensure that we do not repeat these mistakes in the future?

**Traditional risk indicators**

An example of a traditional risk indicator list is included below. It should, however, always be remembered that women with these indicators may quite happily have a normal and uneventful pregnancy and birth, while many women who do not show any of them may quite suddenly develop complications. Recent research has cast doubt on the value of lists such as these as reliable predictors of obstetric problems and there is now emphasis on care givers to remain alert and caring with all women regardless of their inclusion or exclusion from lists such as that provided here. This list is included here as a possible source of complications for women but not as a reliable indication of at risk status.

It should also be acknowledged that women may show signs of some complications at some stages in the pregnancy which later resolve themselves (e.g. transient rises in blood pressure). There is no need to classify such women as being at risk for the entire duration of their pregnancy and birth care or to treat them differently throughout. The care giver needs to remain flexible regarding the care protocols followed and allow the woman to move from at risk back to low risk as her condition changes. If all women are cared for vigilantly at all times, the strict classification of women as at risk as applied in the past is no longer appropriate.
It should also be noted that classification as at risk should not automatically result in a routine treatment protocol for all such women (e.g. with admission to pathological wards rather than physiological wards). Such treatment protocols should be determined on the basis of the particular risk factor which the woman has, and the care she is offered should be tailored to her specific needs. Some women may be at risk of complications which emerge during the pregnancy itself (history of spontaneous abortion) but not necessarily for difficulties in labour. Others may be at no risk for difficulties in pregnancy but at greater risk during the birth itself (e.g. previous Caesarean section). Others may be at greater risk of developing difficulties with breastfeeding (e.g. with previous sexual trauma involving the breasts) but not be at risk for pregnancy.

Vigilance for all and individualized care protocols remain the important guiding principles to follow.

The main categories of risk factor which have traditionally been observed are:

- **general risk factors:**
  - maternal age (<18 or >35)
  - maternal socioeconomic factors (unemployment, poverty, etc.)
  - maternal lifestyle features (smoking, alcohol, drug abuse, etc.)
  - maternal cohabitation status;

- **past obstetric history of:**
  - Caesarean or instrumental deliveries
  - small or large babies
  - prematurity
  - precipitate labour
  - perinatal loss
  - two or more terminations of pregnancy
  - pregnancy-induced disorder (hypertension, diabetes, haemorrhage)
  - parity (first baby at >30 years: grande multiparity)
  - rhesus isoimmunization;

- **past medical history of:**
  - maternal hypertensive disease
  - maternal cardiac disease
  - maternal infection
  - previous relevant surgery
  - maternal medications
  - other relevant medical condition;

- **family history of:**
  - hypertension (especially pregnancy-related)
  - diabetes
Module 4. The Concept of Risk

- congenital abnormalities
- other relevant family history;

- physical features, including:
  - maternal height (<5 feet/150cm), weight (>85kg or <45kg), body mass index
  - rhesus negative blood group
  - general physical examination
  - overall maternal health;

- specific complications of pregnancy include:
  - anaemia
  - hypertension (above 140/90)
  - diabetes
  - renal disorders
  - haemorrhage
  - abnormal fetal growth/uterine size
  - abnormal amniotic fluid volume
  - abnormal placental site (if known)
  - multiple pregnancy
  - abnormal fetal presentation/lie in third trimester
  - other observed abnormality.

It must be remembered when using a guide such as the above, however, that there are some important principles of risk screening. These include the facts that:

- no screen is infallible;
- the designers and users of the system must accept the balance between sensitivity and specificity;
- there is no value in screening if it is not applied;
- normal pregnancies should be managed differently from those with complications;
- locally agreed thresholds/criteria will be more acceptable than those imposed from above (but should always be evidence-based).

GROUP WORK
Discuss how often women should be seen during normal pregnancy and by whom (midwives/obstetricians/both). Debate these issues widely. Try to justify and provide evidence (if any) for your answers.
[Note to trainers:
Challenge the participants to defend any routine practices in labour, and ask others to criticize these practices. Insist that no practice can be allowed to pass unless it has been proved to be effective and to carry no or acceptably little risk to mother. Debate should also be started on answering the challenges for the future.

Remind participants that in most countries widespread dissatisfaction with maternity care among mothers starts from the belief that interventions are performed in normal pregnancies that are unjustified, unhelpful and frequently demeaning to women.

Ask participants to consider how future packages of care will be effective and evidence-based.]

**When does pregnancy become complicated?**

This should be very simple but in practice it is not. Questions which we need to address include:

- To what extent can the design of maternity care assist or interfere with the recognition of transition from normal to complicated, and therefore by definition the provision of quality care?
- Does the structure enable appropriately timed and prompt delivery of care?
- Is it provided by the right grade of professional? How do you define the right grade – is it the most senior person available, or a person of the seniority appropriate to the task?

These are fundamental questions that provoke analysis of the whole design of the care system.

Overdiagnosis is an ever-present risk. Risk is not too strong a word. Misused diagnoses devalue medicine, particularly in the natural process of pregnancy, and serve to undermine the credibility of the maternity health service. Maternity care has been frequently affected by the problem of overdiagnosis. However, the neglect that stems from underdiagnosis is just as dangerous.

Part of the problem lies in the definition of even the most common problem. How do we define pre-eclampsia, for example?

The following group work will be challenging. In doing it, do not accept any prior assumptions. The most important point in discerning when low risk becomes high risk is an understanding of the **sensitivity and specificity of tests**.

<table>
<thead>
<tr>
<th>GROUP WORK</th>
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<tbody>
<tr>
<td>Define and decide on diagnostic tests for:</td>
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<tr>
<td>– pre-eclampsia</td>
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<tr>
<td>– anaemia</td>
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<tr>
<td>– maternal disease of obstetric significance</td>
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<tr>
<td>– significant (as opposed to trivial) antepartum haemorrhage.</td>
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<tr>
<td>Define how you would diagnose:</td>
</tr>
<tr>
<td>– fetal growth restriction</td>
</tr>
<tr>
<td>– fetal macrosomia</td>
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<tr>
<td>– fetal distress.</td>
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Critically assess the design of the antenatal care available in terms of the facilities and the personnel. Focus on whether the definitions reached by consensus are of clinical or simply epidemiological (i.e. classification) value.
The Problem

- Most infections in pregnancy are not worrying, and it is important that those giving care to the pregnant woman not impose unnecessary restrictions on the pregnancy or unnecessarily waste resources. Of course, some infections can be disastrous for mother, baby or both, but they are very much in the minority.
- In any health care system there is an imperative need not to waste resources, particularly where such resources are limited. Analysis of health care practices in the European Region has demonstrated in many countries widespread practices in the field of infections in pregnancy that are either ineffective or, worse still, likely to be harmful. This module will therefore concentrate heavily on interventions that appear at present to be effective, and will attempt to identify practices that are inappropriate. It is not intended that this will be a substitute for a large textbook, but rather that it may encourage critical thought.
- Infections in pregnancy can be subdivided into those which affect pregnancy and those which do not affect pregnancy.
- This grouping is important, not least because those in the second category should not be managed in any different way from in the non-pregnant state.
- There is of course a third category: infections that are influenced by pregnancy. However this category is in effect a sub-category of the above two categories, as will become clear.
- Not all infections are discussed, and those that are discussed are discussed largely from the perspective of the obstetrician/midwife.

General Principles

- Never screen for infection unless such screening is of proven benefit.
- Never screen for infection if the result of such screening is of no practical benefit locally – i.e. if treatment of the screen positive woman is beyond the capability of local resources.
- All diagnoses should be made using internationally agreed definitions; the presence of bacteria is not necessarily the same as the existence of infection, for example.
- Never treat a woman unless there is a reasonable expectation of positive benefit.
- Never treat a pregnant woman with methods of unproven benefit in pregnancy.
- Only admit a woman to hospital for treatment if that treatment can only be given in hospital; admission to hospital may itself introduce risk to the mother, baby and to others.
- Never isolate a pregnant woman from her baby or from other women unless there is genuine risk to her or others from such contact.
- Never use maternal infection as a pretext for interfering with breastfeeding unless there is a genuine and identifiable risk to the baby from such contact.
- The current high prevalence of sexually transmitted infections in women in the European Region underlines the need for health workers to use universal precautions when dealing with body fluids.
Different countries will have different priorities in the field of infections: with limited health funds there is little possibility of providing universal cover for all infections. This will greatly influence local activities.

**Infections that Affect Pregnancy**

**Urinary tract infections**

There is reason to believe that estimates of urinary tract infection rates in many countries in the European Region are too high. Unfortunately many infections are asymptomatic (asymptomatic bacteria), and even if there are symptoms they may be difficult to distinguish from normal pregnancy (for example: frequency of urination), and this presents real problems in diagnosis. The diagnosis can only reliably be made by quantitative bacteriological analysis (>10^5 colony forming units/ml), but that is expensive and not widely available in all sites in many countries in the European Region, and as a result the estimates of infection rates from such countries are understandably inaccurate.

Even allowing for this UTIs are common in pregnancy, but fortunately they can usually be easily and effectively treated with a 5–7 day course (if there are symptoms) of cheap antibiotics (local practices will influence the choice: ampicillin, cephalosporins, or nitrofurantoin are widely used). Women do not need to be admitted to hospital for straightforward lower UTIs (but see below).

Testing of urine with reagent sticks (looking for proteinuria or nitrites) is a simple but not cheap method of testing for infection. Availability of such testing will depend on the funding.

There is a significant increased risk (compared to a non-pregnant woman) of developing an ascending maternal infection (pyelonephritis), and pyelonephritis can cause preterm labour, fetal growth retardation or fetal death. Pyelonephritis in pregnancy is a serious infection for the mother also, with a significant risk of causing permanent renal damage, and hospitalization and administration of IV antibiotics is advised. Women can be discharged from hospital within a day or two of the loin pain settling, since the infection will then be adequately treated.

The challenge therefore lies in trying to ensure that as many women as possible with genuine UTIs are treated, aiming to prevent progression to pyelonephritis, without treating large numbers of women unnecessarily.

UTIs are not contagious, and isolation of a woman and/or delivery as though she is “pathological” is illogical and not helpful.

**Local Issues:**

- How can you diagnose UTI in pregnancy?
- If you have quantitative bacteriological analysis available, how often should you perform it in an asymptomatic woman?
- How can you try to minimize over-treatment of unaffected women?
- How can you ensure that the woman is not “stigmatized” by a prior diagnosis of UTI?
**Syphilis**

Syphilis affects both the course of the pregnancy (increasing prematurity and stillbirth rates) and the fetus (through transmission of congenital syphilis). Treatment is with penicillin. Women do not generally need to be admitted to hospital for treatment.

Treatment can be effective and reduce morbidity for both mother and baby. Women with syphilis have a high risk of carrying other sexually transmitted infections, and should be tested for them.

Once adequately treated women with syphilis do not need to be isolated from other women and do not pose a risk to their baby.

**Local Issues:**
- How can you diagnose syphilis in the pregnant woman?
- How often should you be testing for syphilis in any pregnancy in your country?
- How would you treat a woman with a positive RPR test? Why?
- What action should you take regarding the partner of the woman?

**Gonorrhoea**

Possibly 80% of women with gonorrhoea will have no symptoms. Infection of the cervix can result in premature rupture of the membranes and premature delivery. Therefore in an area with high prevalence of gonorrhoea it can be argued that screening for gonorrhoea might be clinically effective. Treatment will depend on local antibiotic sensitivity. Because simultaneous infection with chlamydia is common, it is advised that anti-chlamydial treatment (using locally-determined antibiotics – erythromycin is commonly used) is also given if gonorrhoea is diagnosed. Treatment of established infection is clinically effective, if the right antibiotics are used.

Women do not need to be admitted to hospital for treatment, but it is important to confirm by further bacteriological swabs that the infection has been eradicated.

Once treated a woman does not have to be isolated from other women nor does she pose a risk to her baby – assuming that she does not become re-infected by her sexual partner. For this reason it is most important that her partner is tested and treated where appropriate.

**Local Issues:**
- How can you diagnose gonorrhoea in a pregnant woman in your country?
- How often do you believe you should test for gonorrhoea in your country?
- What treatment would you use in your country?
- What action should you take regarding the partner of the woman?

**Chlamydia trachomatis**

Chlamydia trachomatis infection is very important for the neonate (chlamydial conjunctivitis, pneumonia) but the effect of the organism on the course of the pregnancy is less important, although it is still significant since miscarriage, preterm rupture of the membranes, preterm delivery and postpartum endometritis are seen. However culture of the organism is not easy (because the organism is intra-cellular) and testing for the antigen is cheaper and easier.
Nevertheless even this is not an option that will be available in all countries in the region, because of funding issues.

Treatment is likely to be with erythromycin in most countries in the Region although the more costly azithromycin may be available for some. Ampicillin, although less effective, can be used if a woman cannot tolerate erythromycin.

Women do not need to be admitted to hospital for treatment.

The partner of any woman with chlamydial infection should be tested and/or treated in the same way.

Once treated a woman does not have to be isolated from other women, nor does she pose a risk to her baby – assuming that she does not become re-infected by her sexual partner. For this reason it is most important that her partner is tested and treated where appropriate.

**Local Issues:**
- Do you screen for chlamydia trachomatis in pregnancy?
- How do you do this?
- What benefit does it bring?

**Bacterial vaginosis**

This is a common vaginal infection and is associated with several bacteria (gardnerella, bacteroides, mobiluncus etc.) and mycoplasma hominis. The infection is a recognized cause of premature labour and chorioamnionitis, and for that reason it may be highly clinically and cost-effective to identify and treat the infection, but there is as yet no evidence to confirm the effectiveness of screening and treatment in reducing adverse outcomes in pregnancy. Many women have no symptoms, but a thin watery discharge with a slightly fishy smell is common. A gram stain of the discharge is a simple and highly effective way of making the diagnosis. Metronidazole for seven days is the treatment of choice, but it may be appropriate to wait until after 13 weeks gestation before giving treatment (because of uncertainty about the safety of the antibiotic for the fetus in early pregnancy). The infection is not contagious, and the partner does not need to be treated, nor does the woman need to be isolated or treated as having “pathology” in labour.

**Local Issues:**
- Do you look for bacterial vaginosis in pregnancy?
- Should you look for bacterial vaginosis in pregnancy?
- Will this be clinically and cost effective locally?

**Group B streptococcus**

This beta haemolytic bacterium is a very important cause of neonatal infection and death. However there is still considerable disagreement worldwide about what the right management is. Group B streptococci can be found in the genital tract of as many as 30% of pregnant women, and even if it was agreed (which it is not) that all these women are “infected” (as opposed to colonized) by the bacterium, treating them with antibiotics in pregnancy is ineffective because
the bacterium returns in very many cases prior to delivery. (Therefore it is felt that there is no value in treating asymptomatic women found to have colonization during pregnancy).

There is no agreement on whether to test for the presence of the streptococcus in late pregnancy with many countries doing so (e.g. United States and Australia) and many not (e.g. United Kingdom).

The newborn can be greatly protected against infection (although this will not be totally prevented) if antibiotics (such as IV benzyl penicillin 2.4 g at onset of labour, followed by 1.2 g every four hours until the baby is delivered) are given to the woman in labour. However, it is totally unacceptable (and potentially very costly) to consider giving antibiotics to a large proportion of labouring women, and there is considerable debate about what is the appropriate group.

Some propose treating all women found to have group B streptococci in their genital tract in late pregnancy, while others restrict treatment to “at risk” groups such as those who have had a previous affected infant, those pyrexial in labour, or those with prolonged ruptured membranes in labour, but there is no uniform consensus view here.

Different countries will adopt different strategies. The role of the clinician is to be alert to the risk of the bacterium, and also to be alert to the risk of an overreaction to the problem, particularly in view of the potential for considerable expense within relatively small benefit.

Women with known group B streptococcal colonization do not need to be isolated, nor should this affect breastfeeding in any way.

**Local Issues:**

- Do you have a local policy for management of women found to have group B streptococci in pregnancy?
- If so, is it clinically and cost-effective?

**Chorioamnionitis**

Chorioamnionitis – where the amniotic fluid, fetus and placenta are clinically infected – is an area where there is considerable disagreement between different countries about the right way to proceed. It is also a classic area where definitions have not always been rationally applied; the presence of bacteria in the presence of ruptured fetal membranes does not necessarily mean that infection is present. Some estimate that 2% of all deliveries are affected by chorioamnionitis.

Classic signs of chorioamnionitis include: maternal fever, maternal tachycardia, raised maternal white blood cell count, offensive smell from amniotic fluid.

The risk to the fetus is significant; overwhelming infection may occur, and cerebral injury is a potential sequel.

Where suspected, intravenous broad-spectrum antibiotics should be given and delivery of the baby is nearly always recommended (otherwise the infection may be difficult to eradicate).

The mother does not need to be isolated and breastfeeding is not contraindicated.
Local Issues:
- How would you expect to make a diagnosis of chorioamnionitis?
- How would you react to a diagnosis of chorioamnionitis?
- Are your actions clinically effective?

**Hepatitis B**

Most women with evidence of hepatitis B infection have acquired the infection before the pregnancy, often by congenital transmission.

There is no treatment for acute maternal hepatitis B apart from supportive measures, and it is only on the grounds of support (hydration etc.) that such a woman should be admitted to hospital in pregnancy.

Very few fetuses are infected in utero if the mother has contracted the infection in pregnancy. However, once delivered, babies of infected mothers should be immunized with hepatitis B immunoglobulin and hepatitis B vaccine, where local resources permit. (This is a very cost-effective strategy in terms of reducing later care costs.)

Identification of the chronic carrier state (hepatitis B surface antigen positive) in pregnant women is highly important (again where local resources permit) since babies born to such mothers are at significant risk of becoming infected at birth. Congenital infection results in a chronic carrier state more frequently than being infected as an adult, therefore all babies from these mothers should receive immunoglobulin and vaccine.

Women who have had hepatitis in pregnancy (and chronic carriers) may pose a risk to all who come into contact with their body fluids, and they underline the need for universal precautions in all health care workers. Partners and family members should be counselled and tested where appropriate.

Local Issues:
- How do you manage women with suspected hepatitis B?
- Does this management make sense?
- Is it clinically effective?
- Do you have the resources to test all pregnant women for hepatitis B antigens?

**Herpes simplex (genital)**

For many women a diagnosis of herpes simplex virus genital infection in pregnancy is deeply shocking, and for many very frightening. (In many cases their reaction is not helped by an inappropriate reaction from their healthcare professionals.) There are many women who believe that the risk of transmission of disease to the fetus, and the risk of death to the fetus is considerable. In fact the risk is small, and is almost entirely restricted to those who have an active primary lesion (first episode of infection) in the days prior to labour.

There is therefore no value in repeated swabs for viral culture in pregnancy. It is far better to ask the woman when in labour whether she has or has recently had any genital sores, and if she has a lesion consistent with herpes then a Caesarean section is advised (unless the membranes have
been ruptured for more than four hours, at which time it is probably too late to prevent transmission of the virus upwards into the uterus).

Herpes virus infection in pregnancy is not an indication for admission to hospital. Women with active herpes infection around the time of delivery should be careful to maintain proper personal hygiene when handling their babies and should not handle other babies. They do not need to be isolated (their genital areas will naturally be covered and will not pose an infection risk to others).

**Local Issues:**
- What do you do clinically if you suspect herpes genital infection in pregnancy?
- Is this clinically effective?

**Cytomegalovirus (CMV)**
CMV is an important virus infection in pregnancy. Effects on the mother and the pregnancy itself, apart from infection of the fetus, are minimal. However, it is estimated that it is the commonest congenital infection and transmission can occur both trans-placentally during pregnancy and during delivery.

It is essential to remember that there is at the present no proven effective way to treat an established infection. For this reason it appears to be an inappropriate use of limited health resources to screen all pregnancies for CMV antibodies.

Even though it must be acknowledged that congenital/perinatal CMV infection represents a serious health problem, the problem is that it is difficult to see how knowledge of the serological status of a woman can help in prevention. This is particularly so since the presence of antibodies cannot reliably identify infectivity. Indeed the concern is that women who are found to be seropositive might be submitted to interventions of no proven benefit and/or isolated for no reason.

Newborns known to be congenitally infected with CMV should be isolated from other neonates as they excrete virus in their urine. They should not be isolated from their mothers or other family members.

**Local Issues:**
- Do you screen routinely for CMV antibodies in pregnancy?
- What benefit does this provide for your population?

**Varicella**
This is a potentially dangerous infection for a neonate to develop, but it is also an unpleasant and dangerous infection for an adult to catch. Unfortunately the cost of immunoglobulin to provide passive immunity for women at risk is so high (possibly US $500) that many countries in the European region will not be able to consider it.

If a woman presents within 24 hours of the onset of the rash she can be treated with acyclovir (if local health resources permit). This can be effective in reducing symptoms and fever, but it does not necessarily protect the infant.
The most important risk to the newborn is if delivery occurs within seven days of the mother developing the rash, in which case there is a real possibility that the baby will not have received antibodies from the mother trans-placentally prior to delivery. Immunoglobulin would be strongly advised in these circumstances, but assuming that immunoglobulin is not available, acyclovir can be given to the baby at the first sign of infection.

If infected in pregnancy, a woman should not be admitted to hospital unless they need supportive care for severe complications (for example: a dense rash, haemorrhagic rash, a heavy smoker, lung involvement with the infection, or the woman is on corticosteroids for other medical reasons).

Women in the viraemic stage pose a serious risk to other mothers and babies and should be isolated. Breastfeeding is to be encouraged.

Local Issues:
- What do you do with a pregnant woman if you suspect that she has varicella – at 20 weeks, at 30 weeks and at 40 weeks?
- Why?

**Rubella**

This is the classic teratogenic infection, with a significant risk of fetal damage if the mother presents with symptomatic infection before 16 weeks. However the disease itself poses no risk to the mother.

Diagnosis is by means of IgG and IgM estimation, looking for a short-lived rise in IgM followed by an IgG response, on paired maternal blood samples taken from a woman who has developed a rash suspicious of rubella.

There is no treatment for the disease. Women proven to be infected at a time of considerable risk to their fetus (before 16 weeks) might choose to abort the pregnancy, but many unaffected fetuses will be aborted if that is done.

Women thought to have developed rubella infection should not be in contact with other pregnant (or potentially pregnant) women. Where possible they certainly should not (except for labour) be admitted to hospital when they are acutely infected (where they might infect others) but once the infection is clinically over they are no longer potentially infectious.

Universal immunization of adolescent women is clearly a highly effective public health measure.

Local Issues:
- Does your country have universal rubella immunization? If not, why not?
- Do you screen for rubella immunity in early pregnancy? If not, why not?

**Parvovirus**

Parvovirus infection of a fetus may cause stillbirth or the development of fetal hydrops. The mother will not be seriously affected by the infection unless she is otherwise immunodeficient.
In countries with facilities for high-technology intra-uterine transfusion of fetuses that are affected with parvovirus infection there may be value in testing women who present in pregnancy with symptoms suggestive of a parvovirus infection. At the present state of funding healthcare, this is likely not to be relevant for many countries in the European Region. The best effective management in these circumstances is to advise all women who may have an acute parvovirus infection to delay pregnancy for a few months in order to be sure that the maternal antibody response has occurred.

Women with suspected parvovirus infection should certainly not be admitted to hospital for that reason since they could pose risks to other fetuses. If suspected of infection in labour the woman does not have to be isolated from other mothers. She should breastfeed in the normal way.

Local Issues:
- Will depend critically on local funding issues.

**Rubeola (measles)**

This viral infection can result in premature delivery and increase perinatal mortality. However, there is no specific treatment, and admission to hospital is to be discouraged since that might expose other mothers and babies to the infection. Clearly a very sick woman (e.g. with pneumonia) should be admitted to hospital for supportive therapy.

Isolation of a woman in hospital with measles is necessary but breastfeeding is not contraindicated.

Local Issues:
- Are women with measles admitted to hospital? If so, why?

**Toxoplasma**

Toxoplasma infection has little or no effect on the pregnant woman, but trans-placental passage may cause major fetal cerebral damage. However maternal serological testing is expensive and will be impractical in many countries. Even in the United Kingdom there is no programme for universal serological testing. In addition, the interpretation of serological positive results involves further invasive, expensive and potentially dangerous (to the fetus) tests.

This is a classic example of a technology that is of potential benefit but of very uncertain usefulness in many – probably most – countries.

Local Issues:
- Do you test for toxoplasma infection?
- If so, can you demonstrate cost-effectiveness locally?

**Listeria**

Infection with listeria monocytogenes is a relatively rare cause (except perhaps in countries where milk for human consumption is not pasteurized) of fetal infection and death, and fetal infection can occur through transplacental spread – rare for a bacterium. Infection in the mother is usually a retrospective diagnosis because the infection presents as a mild flu-like illness.

Clinically it is of little practical importance because the disease is usually recognized after any fetal damage has occurred.
If recognized, infection in a pregnant woman can be treated with high doses of penicillin.

**Local Issues:**
- None likely.

**Tuberculosis**
The recent increase in numbers of cases of tuberculosis (TB) in the European Region indicates that this is a significant public health issue once more in this Region.

The basis of management must be the identification and prompt treatment of all infected pregnant women. By this means the incidence of neonatal infection (which can carry very high mortality) will be to some extent controlled. The approach to this will be determined by national policy.

It is unlikely that the obstetrician or midwife will have a major role to play in the management of this disease, but maintaining a high index of suspicion in women with symptoms compatible with a diagnosis of TB is an important contribution.

**Local Issues:**
- Will be dictated by national policy.

**Malaria**
This is currently so rare in the European Region that it does not warrant discussion here.

**Acute appendicitis**
Although strictly speaking not an infection, this merits discussion if only to remind clinicians that this occurs in pregnancy, that it can be extremely difficult to diagnose because the presence of the pregnant uterus can mask the usual symptoms, and that it can result in peritonitis if undiagnosed which can precipitate preterm labour.

**Local Issues:**
- Are you aware of cases of appendicitis that have been diagnosed dangerously late in pregnancy?
- Do you feel that your staff has sufficient awareness of appendicitis in pregnancy?

**Infections that do not affect the pregnancy**

**Vaginal Candidiasis**
Although this infection becomes much more common in pregnancy, it is not a particularly important infection, in that it has very little effect on the pregnancy (as opposed to the mother) or the fetus.

Where medical resources are limited there is little benefit in either looking for or treating candidal infection unless a woman is troubled by symptoms, particularly since the infection will frequently recur (and because the drugs used are not cheap). Oral treatment may be inadvisable (fetal effects are unknown) but otherwise treatment of a woman and/or her partner follows standard principles.
Local Issues:
- Do you screen for candidal infection in pregnancy?
- If so, what benefit do you think it brings?

**Trichomonas**

So far it has not been shown that trichomonas infection in pregnancy leads to a worse pregnancy outcome. From that point of view therefore it is arguable whether it is cost-effective or clinically effective to screen for trichomonas infection in all pregnancies (50% of women with infections have no symptoms). However a woman with symptoms – and her partner – should be treated with metronidazole but avoid high doses in a pregnant woman. The infection is not transmissible by other than sexual behaviour and an infected woman does not need to be isolated or treated as “pathological,” nor does she pose a risk for her baby.

Local Issues:
- Do you screen for vaginal trichomonas infection in pregnancy?
- If so, what benefit does it bring?

**Genital wart virus infection**

The finding of genital warts in a pregnant woman is another potential cause of considerable anxiety for women. Fortunately this is nearly always unnecessary. Only very rarely will warts pose a problem to the fetus. Occasionally, if there is a huge number of warts around and obscuring the introitus, it may be argued that it is appropriate to advise delivery by Caesarean section. Normally however there are only a few warts and they are not a reason to interfere in the normal processes.

A woman with genital warts should not be isolated. She should breastfeed in the normal way.

Local Issues:
- Do you take ant particular actions when you find genital warts in a pregnant woman?
- Is there any evidence to support your actions?

**Conclusions**

- Infection remains a major cause of maternal and perinatal mortality in many countries in the European Region.
- Provided that management is in line with accepted and logical principles, clinicians can be of considerable assistance in many infections in pregnancy.
- However there is good evidence that inappropriate diagnosis and management causes considerable wastage of limited healthcare resources in many countries.
- Adherence to rational principles and policies, based on the blending of the current state of clinical evidence with available local resources will result in better outcomes and greater satisfaction among users.
- All clinicians have a part to play in improving the current situation.
**Prevention of mother-to-child transmission of HIV**

Infection with Human Immunodeficiency Virus (HIV) has become a serious public health concern all over the world and an increasing number of people are becoming infected. HIV is transmitted in only three ways: through blood or blood products, donated semen or organs, or from an infected mother to her child (mother-to-child transmission).

More than 70% of all HIV infections are a result of heterosexual transmission and over 90% of infection in children result from mother-to-child transmission (MTCT). The rise in infections among women, most of them at the height of their reproductive years, has greatly increased prevalence of HIV in infants. More than 600 000 children are infected by mother-to-child transmission of HIV annually, over 1600 each day.

In the European Region, the most common routes of infection for women of childbearing age are through sexual activity with an infected partner, intravenous drug use, sex with drug users or bisexual men or through commercial sex work.

The immediate challenge is to reduce the transmission of HIV from mother to child, while at the same time reducing the overall number of infected women of reproductive age.

Health workers in maternity settings have three responsibilities:

- To provide appropriate and sensitive management for women who are HIV-positive.
- To use the opportunity to counsel and inform HIV-negative women about HIV and how to avoid infection.
- To work in a safe manner for themselves and their colleagues, to reduce the risk of occupational exposure to HIV and other infections.

Reported rates of transmission from mother to child ranges from 15% to over 40% in the absence of antiretroviral treatment and vary across countries. With widespread use of antiretroviral therapy much lower transmission rates are now described.

Transmission of HIV from mother to child can take place in-utero, at the time of labour and delivery, or postnatally through breastfeeding. Knowledge about the likely timing is important for the design of possible interventions. Where women do not breastfeed, most of the transmission occurs at the time of labour and delivery, while transmission in early pregnancy is less common. In resource-poor settings, where women have no alternative to breastfeeding up to 1/3 to 1/2 of transmission is thought to be due to breast-milk transmission.

Proven strategies to reduce or prevent MTCT when a woman is known to be infected with HIV include:

- antiretroviral therapy: long course zidovudine or combination, short-course zidovudine or combination, nevirapine¹;
- elective Caesarean section;

¹ARV regimens for prevention of MTCT (see Annex 1)
replacement feeding for the infant;
- an option of termination of pregnancy where safe and legal services exist.

Possible strategies for the prevention of mother-to-child transmission of HIV

Specific measures to prevent HIV infection in women and their partners include:
- providing information about transmission of HIV and STIs;
- promoting safer sex and making condoms widely available;
- providing early detection and appropriate treatment of STIs;
- ensuring the safety of medical procedures such as blood transfusion and ensuring that universal precautions are implemented in all health facilities.

Strategies which may potentially reduce MTCT, but where further studies are needed, include:
- micronutrient supplementation during pregnancy
- cleansing of the birth canal with a microbicide during labour and delivery
- detection and treatment of STIs
- antiretroviral treatment to children during the breastfeeding period.

Voluntary HIV counselling and testing in pregnancy

Wherever possible, voluntary counselling and testing should be available to any pregnant woman who requests it and offered to all in areas of moderate and high prevalence. Routine testing of pregnant women without consent or without access to counselling is, however, an unacceptable practice and the disadvantages may negate any benefit obtained from knowing the HIV status of the women. These include a reluctance to utilize maternity services through fear of discrimination, denial of a positive diagnosis and stigmatization.

Pre and post-test counselling are essential elements of the management of HIV in pregnancy. Pretest counselling enables women and men to make informed decisions about an HIV test. Post-test counselling is an integral part of the management of the HIV-positive person, and provides an important opportunity for risk reduction messages for those found to be HIV-negative.

Trust is one of the most important factors in the relationship between the health care provider/counsellor and the client. It enhances the relationship and improves the chances that the individual will act on the information provided. Given the possibility of discrimination, ostracism and personal recrimination that an individual diagnosed with HIV may face, it is all the more important that confidentiality be guaranteed. Confidentiality forbids any reference to, or discussion about, a client, except within a professional relationship, and only then with the consent of the client.

The delay between taking the test and giving the result should be as short as possible as the woman may be very concerned about the test and the implications of the result. Women should be encouraged to bring their male partner(s) for counselling and testing whenever possible.
There are several issues to be addressed when counselling HIV-positive pregnant women. These include: options of termination of pregnancy, discussion about disclosure to male partner, the risk of MTCT and possible interventions to prevent this, other treatment options, infant feeding and HIV and future fertility.

HIV-infected women should be given appropriate information to make informed decisions about the continuation of their pregnancy and future fertility. Termination of pregnancy should be offered to HIV-positive women, where this is legal. It should be clear to health workers that offering termination should never be coercive and that all women, irrespective of their HIV status, have the right to determine the course of their reproductive life.

**Management of HIV-positive pregnant women**

Most HIV-positive women will be asymptomatic and have no major obstetrical problems during their pregnancies. They should receive similar antenatal obstetric care to that given to HIV-negative women, unless indicated by the need to provide specific HIV-related treatment.

**Labour and delivery care**

Labour can be a very stressful time for HIV-positive women; they are concerned about the risk of transmission to their child, about possible stigmatization by medical and nursing staff and about their own uncertain future. A guiding principle in the care of HIV-positive women in labour is that they will require an especially supportive and encouraging attitude from health workers, in addition to appropriate medical and obstetric care.

Several factors have been associated with an increased risk of MTCT at the time of labour and delivery. These include:

1. The mode of delivery:
   Vaginal delivery has a higher risk of transmission than elective Caesarean section delivery.

2. Prolonged rupture of membranes:
   Rupture of membranes for longer than four hours has been associated with an increased risk of transmission.

3. Episiotomy:
   Episiotomy may increase the risk of MTCT.

4. Intrapartum haemorrhage:
   Has been associated with increased transmission in some studies.

5. Invasive fetal monitoring:
   Penetrating scalp electrodes may be associated with increased transmission risk.

6. Twin deliveries:
   First twins have a higher rate of HIV infection than second born twins.
Where the necessary resources and infrastructure exist HIV-infected pregnant women should be offered an elective Caesarean section on the indication of reducing mother to child transmission of HIV.\(^2\)

There is no need for HIV-positive women to be isolated or treated differently during labour and delivery from any other woman. All staff in maternity services should know how to deal with the exposure to blood and other body fluids, which is common in obstetric practice. Universal precautions\(^3\) should be used at all times and appropriate equipment should be supplied. Universal precautions to reduce the risk of transmission of HIV and other infections should be used for all cases and not only for those who they know to be HIV-positive.

**Postpartum Care**

HIV-infected women are more prone to postpartum infectious complications – including urinary tract, chest, episiotomy and Caesarean section wound infections. Health care workers should be aware of this and observe for signs of infection. Mothers should be given information on how to care for their babies without the risk of exposure to infection, and full discussion on the risks and benefits of infant feeding choices. Where the resources and infrastructure exist for an HIV-infected woman to provide adequate replacement feeding up to two years of age she should counselled to avoid breastfeeding to reduce the risk of HIV transmission. Before discharge from the maternity unit contraceptive advice should be given and early arrangements made to start with an appropriate method. Contraceptive advice is particularly important when a mother does not breastfeed because of the loss of the contraceptive properties of breastfeeding.

**Care of neonates**

Immediately after delivery:

- The cord should be cut under cover of a lightly wrapped gauze swab, to prevent blood spurting.
- All babies, regardless of HIV status of the mother, should be handled with gloves until maternal blood and secretions are washed off.
- All babies irrespective of HIV status should be kept warm post-delivery.
- Immediately after birth, the baby should be wiped dry with a towel or surgical cloth at the bedside to remove blood and maternal body fluids. Alternatively, the baby can be washed with a warm chlorhexidine solution.
- There should be no suctioning of the newborn with a nasogastric tube unless there has been meconium stained fluid. Where suctioning is required, it is better to use a mechanical suction unit (at a pressure below 100 mmHg) or bulb suction, if possible, rather than mouth operated suction.
- Vitamin K should be administered as usual. Care should be taken with any injection to ensure that the injection site of the baby is cleaned with surgical spirits and that a sterile disposable needle is used (this should occur with all deliveries).
- BCG should be administered.

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\(^2\) Studies demonstrating the effect of elective Caesarian section in reducing MTCT of HIV (see Annex 2).

\(^3\) Important precautions in obstetrics (see Annex 3).
Infants should receive an antibiotic or 1% silver nitrate eye ointment as prophylaxis against ophthalmia neonatorum.

Attaching the baby to the mother’s breast should only occur if the mother has made a decision beforehand to breastfeed.

If the mother has decided not to breastfeed, the baby should be placed on the mother’s body for skin-to-skin contact. In addition, provision should be made in the nursery to provide the baby with infant formula or an alternative option. The mother should preferably use a cup to feed her baby.

**Infant Feeding**

HIV-infected women should be respected and supported in their decision regarding infant feeding practices. Replacement feeding in the case of HIV is not a violation of the rules of the “Baby-Friendly Hospital Initiative”. And there is no need for these to be revised. Replacement feeding in the context of HIV is a medical indication for not breastfeeding.

**Monitoring children exposed to zidovudine in pregnancy**

Anaemia has been the most common complication seen in the neonate with the long course treatment of six weeks ZDV to the child. Hemoglobin should be measured at the baseline and after six weeks and 12 weeks if this regimen is used. The anaemia risk is much less with the short-regimen.

**General Care**

Children born to HIV-positive mothers should be followed up on a regular basis. This should be arranged to coincide with immunization schedules. It is important to monitor growth of these children, firstly because failure to thrive may be an early sign of infection in the child and secondly because replacement fed infants need ongoing surveillance to ensure that they are growing adequately.

Babies born to HIV-positive mothers will carry maternal antibodies to HIV, so all of them will test positive using antibody tests such as ELISA or simple/rapid tests, until around 12–15 months when the maternal antibodies disappear. This means that a diagnosis of HIV infection using HIV antibody testing can only be made after this time.

Polymerase chain reaction (PCR) measures viral proteins directly, and so is not affected by the maternal antibodies. If this is available, a diagnosis can be made much earlier (2–3 months), but it is an expensive test and is not available for routine use in most countries.
### Annex 1

#### ANTIRETROVIRAL TREATMENT REGIMENS IN PREGNANCY

<table>
<thead>
<tr>
<th></th>
<th>Antenatal</th>
<th>Intrapartum</th>
<th>Postpartum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEVIRAPINE</strong></td>
<td></td>
<td>1 dose of 200 mg orally at onset of labour</td>
<td>1 dose of 2 mg/kg within 72 hours of birth</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ZIDOVUDINE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(ZDV, AZT)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SHORT COURSE:</strong></td>
<td>300 mg orally twice a day from 36 weeks</td>
<td>300 mg orally 3 hourly from onset of labour to delivery</td>
<td></td>
</tr>
<tr>
<td><strong>LONG COURSE:</strong></td>
<td>100 mg orally 5 times per day OR</td>
<td>2 mg/kg intravenously for first hour then 1 mg/kg/hour IV until delivery</td>
<td>2 mg/kg ZDV syrup 6 hourly for 6 weeks to child</td>
</tr>
<tr>
<td></td>
<td>200 mg orally 3 times per day OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>300 mg orally twice a day at 14–34 weeks of pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>POSTPARTUM</strong></td>
<td></td>
<td></td>
<td>2 mg/kg ZDV syrup 6 hourly for 6 weeks to child</td>
</tr>
<tr>
<td><strong>(where no antenatal or intrapartum treatment received)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ZIDOVUDINE PLUS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3TC (Lamivudine)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PETRA “A”</strong></td>
<td>ZDV 300 mg twice daily 3TC 150 mg twice daily</td>
<td>ZDV 300 mg 3 hourly 3TC 150 mg 12 hourly</td>
<td>One week:</td>
</tr>
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<td></td>
<td>3TC 150 mg twice daily</td>
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<td>2 mg/kg/12hr</td>
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<td><strong>PETRA “B”</strong></td>
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<td>3TC 150 mg twice daily</td>
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<td></td>
<td>Infant: ZDV 4 mg/kg/12 hr 3TC:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 mg/kg/12hr</td>
</tr>
</tbody>
</table>
Annex 2

ELECTIVE CAESAREAN SECTION

Caesarean section has been shown in several studies to reduce the risk of transmission of HIV. In a large meta-analysis of over 8500 mother–infant pairs, elective Caesarean section reduced the risk of transmission by over 50% compared with vaginal delivery. Transmission was reduced from 7.3% to 2% in women in the analysis who had elective Caesarean section and had received long course antiretroviral treatment. Elective Caesarean section reduced transmission by more than half in a randomized trial in Europe and to below 1% in women also taking long course antiretrovirals in France.

This potential benefit has to be balanced against the risk to the mother of the operation; higher rates of postoperative morbidity have been reported in HIV-positive women, especially infective complications. Caesarean section itself is more risky than vaginal delivery as has been shown in HIV-negative women. This is due to the increased risk of anaesthetic complications and of postoperative infection. The risks are often higher if the woman arrives late in labour with advanced complications such as intrauterine infection and sepsis. When giving birth in subsequent pregnancies, the risk of uterine rupture will depend on the woman's access to qualified services, with careful monitoring of vaginal births and with the possibility of a repeat Caesarean section.

Annex 3

IMPORTANT PRECAUTIONS IN OBSTETRIC CARE

Reducing needle stick injuries by handling used needles as little as possible, using a needle holder during episiotomy, avoiding recapping disposable needles and taking great care in recapping sampling barrel system needles or non disposable syringes, placing needles and other sharps in the appropriate containers.

1. Washing hands with soap and water immediately after contact with blood or body fluids.
2. Wearing suitable gloves when expecting exposure to blood or body fluids.
3. Covering broken skin or open wounds with watertight dressings.
4. Wearing an impermeable plastic apron for delivery.
5. Wearing an eye shield for operating or assisting at Caesarean section and for suturing episiotomies.
6. Wearing double gloves, if possible, for all operations, which reduces considerably the amount of blood carried through if the glove is punctured.
7. Using an appropriate sized needle (21 gauge, 4cm, curved) for the repair of episiotomy, together with a technique using a needle holder.
8. Passing all sharp instruments onto a receiver, rather than hand-to-hand at Caesarean section and modifying surgical practice to use needle holders and to avoid using fingers in needle placement.
10. Wherever possible, avoiding the need for suction of newborns and using mechanical or bulb suctions when required. If no other suction is available, ensuring that the trap in the mouth operated De Lee suction apparatus is functional.
11. Disposing of solid waste such as blood soaked dressings or placentas safely, according to the local procedures.
MODULE 6.
EDUCATION FOR PARENTHOOD

At the end of this session participants should:

- know the objectives of parent education
- know what topics are usually included in education programmes for parents
- know what skills are required by those educating parents
- understand the basic principles of antenatal exercises.

Readings:
The gestation of a childbirth education diploma.
Sexuality during Pregnancy

Parentcraft sessions are commonly introduced in the antenatal period when mothers and fathers (or other partners and friends) can meet with others in a similar situation to discuss hopes, fears and expectations and to exchange their knowledge and experience. The aim is to familiarize the families with the changes that are taking place during pregnancy, what to expect during labour and to provide education and advice on the changes that parenthood will bring.

The midwife should be there to answer the couples’ questions, to provide reassurance and to give mothers confidence in their ability to cope with pregnancy, labour and the baby in the postpartum period.

The timing of the sessions is important. It is useful to have one or two early sessions to discuss diet, smoking and alcohol consumption, although ideally this should be provided long before couples decide to have a baby (e.g. at school or during preconceptional care). Meeting other parents who are going through the same changes in their lives helps to provide support and companionship during this new adventure in life.

The majority of parent education sessions are traditionally held in the last 12 weeks of pregnancy although there is no real reason to delay them until this late in the pregnancy. It is, however, important to discuss issues of importance to parents at the time of the pregnancy when they attend classes. As labour approaches this becomes the issue of most importance, breastfeeding becomes even more important once the baby is there although some preparation must be given during the pregnancy too. Adjustment to marriage and the roles of the partners once the baby is born may be important issues to discuss earlier on in pregnancy or after the baby is born. Adjusting the topics to be discussed to the timing of the pregnancy and postpartum period makes it easier for the parents to be more receptive to what they are being taught.

While it is traditional for classes to be held during the pregnancy, it is more appropriate for classes to continue at least into the first year of parenthood. Talking of postpartum experiences during pregnancy when the baby is only an abstract (and often romanticized) idea is not very helpful in assisting parents to cope with the many difficult experiences that often accompany the joyful moments of life with a new baby. Current approaches to childbirth and parenthood education involve a series of classes extending throughout the pregnancy and first year of the baby’s life.
**Possible topics for sessions**

Pregnancy care:
- so-called minor discomforts of pregnancy
- nutrition during pregnancy and after delivery
- preparation for breastfeeding
- antenatal exercises
- psychological adjustments during pregnancy.

Labour and birth:
- process of labour and birth
- pain relief in labour
- companionship in labour
- common interventions used in many labours
- Caesarean section
- psychological adjustments to labour and birth
- skin-to-skin contact with the newborn and early breastfeeding.

Postpartum care of the mother:
- breastfeeding
- postnatal exercises
- psychological adjustments to marriage and life with a new baby
- sexuality during pregnancy and after birth
- working after childbirth.

Postpartum care of the baby:
- care of the baby/equipment needed
- coping with crying babies
- stimulating your baby
- baby’s developmental milestones
- immunization for babies.

The father’s role:
- the father’s role throughout the transition to parenthood
- father’s concerns.

This is not a definitive list but includes most of the commonly held discussions.
The purpose of education for parenthood

The objectives of educating parents for parenthood are:

- to give a couple more confidence;
- to help a woman have a happy, healthy pregnancy, birth and parenthood experience;
- to prepare the couple for the reality of labour and to provide the woman with tips to help her cope;
- to persuade them to adopt a healthy lifestyle to ensure a speedy recovery after birth;
- to help and support the woman to breastfeed through telling her about successful breastfeeding techniques and management;
- to assist her to care for her baby regardless of what feeding method she uses;
- to help the couple to adjust to parenthood;
- to provide a source of support which continues throughout the couple’s transition to parenthood;
- to provide appropriate education and information for parents about pregnancy, birth and parenthood.

GROUP WORK

Discuss how women are empowered to make decisions about their care during the antenatal period and labour. Share novel approaches which encourage the involvement of women in decision-making which you would like to introduce, or which are in place, in your health care service.

Skills required to facilitate the education of parents

The skills required to offer appropriate and effective education for parents are many and are discussed in more detail in the accompanying reading. But the following at least are needed in anyone preparing parents for their transition to parenthood:

- sound knowledge of the process of pregnancy, labour and the puerperium and the ability to relate this to the changes which the women and their partners will experience and to the care they receive;
- knowledge of fetal and infant growth and development, and health care;
- sensitivity and knowledge of the psychological adjustments that most parents will experience as they enter into parenthood;
- some understanding of teaching methods, including lecturing and discussion, and the use of visual aids (which can be homemade or improvised);
- effective communication skills so that women and their families can understand the information presented, the ability to answer questions honestly, counselling skills and the ability to listen to and be sensitive to couples’ concerns;
- the ability to modify, adapt, change and revise the content and format of the session to suit the needs of the couples concerned;
- the recognition that the most important people in the maternity care system are the women and their families.
GROUP WORK
Discuss how well midwives in your setting have the required skills to offer classes for expectant couples. Discuss how these skills can be developed and what is needed to achieve these goals. What can you do to provide these needs in your setting?

Antenatal exercises

Parentcraft classes also provide opportunities for women to learn exercises that will help them during pregnancy and birth. Exercises should be taught by someone who has been specially trained and is competent to do this. The goal is not to create physical fitness during pregnancy but to assist the mother to cope in labour by learning to relax as much as possible. Focusing on exercises which sensitize the woman to feelings of tension and relaxation in her body during pregnancy may help her to be aware of sensations of tension during labour and to relax herself as much as possible during this time.

The importance of resting should be discussed, as should the techniques of coping with posture changes and the relief of minor disorders such as backache.

The aim is to create an environment with a relaxed atmosphere. The exercises should be rhythmical and should not cause any discomfort. They are taught by demonstration, and the women are observed to ensure that they are doing them correctly and avoiding damage.

Following each exercise session there should be a period of relaxation. Relaxation must be practised regularly to reduce body tensions. It is particularly useful during pregnancy, labour and the early postpartum period. Learning to tighten individual muscles followed by relaxing helps the mother become aware of the difference between being tense and relaxed. Breathing can be used to increase the depth of relaxation – slower breathing leads to increased relaxation. This can be used to relieve discomfort in labour. The emphasis is on rhythmic breathing; avoid rapid breathing (hyperventilation), shallow panting or long periods of holding the breath.

[Note to trainers:
It is advisable to take a break after practising exercises rather than moving on immediately to another session.]
Module 6. Reading
The gestation of a childbirth education diploma

B.E. Chalmers and G.F. Hofmeyr*
School of Psychology, University of the Witwatersrand, Johannesburg and Department of Obstetrics & Gynaecology, Coronation Hospital, Johannesburg, South Africa


Abstract

A proposed two-year post-graduate Diploma in Childbirth Education is described. The proposed course is based on the assumptions that preparation for parenthood involves a holistic view of pregnancy, birth and the early parenthood years and that such preparation should be directed towards couples or families rather than only mothers. Also evident in the proposed diploma is the multidisciplinary nature of the education that is required, spanning both biological and social sciences. The planning of the diploma is described together with its conception, embryonic and fetal development and anatomy. Complications occurring during its gestation and delivery are outlined.

Planning the infant

Several years ago the Association for Childbirth and Parenthood recognized the need for improved training of childbirth educators in South Africa. At their instigation, one of the authors (B.E.C.) initiated an enquiry into the feasibility of establishing a university-based childbirth education training programme through the University of the Witwatersrand, Johannesburg. This paper outlines the stages of development of this programme, its contents and its current status.

Conception

Initially, with the approval of the Heads of Departments concerned, representatives of the Departments of Obstetrics and Gynaecology, Community Health, Physiotherapy, Nursing Education, Occupational Therapy and Psychology met and agreed upon the need to develop a training programme for childbirth educators. Educational objectives established by this committee covered 33 areas of functioning or expertise required from graduates of the programme (Appendix A). Objectives were based on two underlying assumptions: that preparation for parenthood involves viewing pregnancy, birth and the early parenthood years as a whole; and secondly that preparation for parenthood should be directed towards couples and not only mothers. Implicit in both these assumptions was agreement that childbirth education must be multidisciplinary, drawing from the biological as well as the social sciences.

Embryonic development

Early embryonic development of the proposed programme included a series of stages.

* Correspondence to: Professor B. Chalmers, School of Psychology, University of the Witwatersrand, P O Wits, 2050, Johannesburg, South Africa.
1. The ideal syllabus for each component to be included in the course was developed by requesting all departments involved to indicate their preferred content, amount of teaching foreseen, and teaching method envisaged. Overlapping areas were then eliminated by agreement between departmental representatives as to the sharing of teaching loads.

2. All Heads of Departments required to participate in the programme were then formally approached with a request for assistance in the teaching of the course in principle. Departments appealed to for help were Departments of Obstetrics and Gynaecology, Paediatrics, Pharmacology, Human Genetics, Physiology, Anatomy, Physiotherapy, Occupational Therapy, Nursing Education and Family Medicine within the Medical Faculty; Departments of Psychology, Social Work and Statistics from the Arts Faculty; and the Graduate School of Business Administration of the University.

3. Specific needs of departments which emerged were attended to and changes made to the proposed programme accordingly.

**Fetal development**

At this point the development of the proposed course emerged from its early embryonic stage to engage the wider administration of the faculty in which it had developed, the Faculty of Medicine.

The proposals were submitted initially to the Postgraduate Committee of the Medical Faculty, then to the Faculty Board itself and thereafter to the Senate of the University, where ultimate approval of the proposed programme was obtained in principle. In the process of proceeding through these evolutionary filters appropriate rules and regulations regarding admission requirements and credit facilities necessary for its inclusion in the University Calendar were also formulated. Practical requirements regarding such issues as teaching materials, venues and library facilities were also finalized.

**Anatomy of the programme**

In essence, the final programme proposed encompassed a two-year, part-time, postgraduate diploma in Childbirth Education. Courses to be offered in the first year of study were: Basic Sciences, Pregnancy and Childbirth and Childbirth Support. The second year of study was to be divided between courses in The Psychology of Childbirth and Birth Preparation.

The first year course, Basic Sciences, encompassed two subcourses, Anatomy of Childbearing and Human Physiology, which together contributed 170 lecture hours and 50 practical hours.

The first year course Pregnancy and Childbirth, covering 37 lecture hours and 140 practical hours included subcourses in Normal Pregnancy and its Management, Pathology of Pregnancy and Management, Medical Intervention in Pregnancy and Labour, Therapeutics of Childbearing and Observations of Antenatal Procedures and Normal and Complicated Labours.

The third study course in the first year, entitled Childbirth Support, included subcourses in Infertility, Human Genetics, Family Spacing, Maternal and Infant Care and First Aid in Childbirth and Parenting and was expected to cover 45 lecture hours and 16 practical periods.

In the second year of study students would be required to study the Psychology of Childbirth over 50 lecture hours and 60 practical hours, as well as Birth Preparation covering 73 lecture hours.
hours and 102 practical hours. The Psychology of Childbirth component contained subcourses in Psychological Aspects of Pregnancy, Reactions to Birth and After Birth, Deviations from Normal, Cross-cultural Childbirth and Child Development. The Birth Preparation course was broken down to include subcourses in the Physiology of Childbirth, Physiotherapeutic Aspects of Pregnancy and Birth, Group Work and Childbirth Education (including Teaching Techniques, Research and Statistics) and Ethical Codes of Conduct and Small Business Management.

Practical components of the programme involved observations or visits, on a cross-cultural basis, of admission wards, antenatal clinics and procedures, antenatal education classes, postnatal clinics, labour wards with normal and complicated deliveries, postnatal wards, neonatal intensive care units, community child health clinics, well baby clinics, family planning clinics, counselling centres, adoption homes, homes for handicapped children and child guidance centres. Attendance at local childbirth and parenting associations’ meetings, conferences and workshops could also be required and practical assignments could involve attachment to families, planning childbirth education programs and conducting aspects of these programmes under supervision.

The total number of teaching hours envisaged for the programme was 252 and 153 lecture hours in the first and second years of study respectively, and 206 and 162 practical hours, giving a combined total of 405 lecture periods and 368 practical hours.

**Antenatal complications**

A number of difficulties arose in the development of this programme. Each problem required a solution specific to the needs of the particular population for which the course was intended. The major difficulties encountered will be dealt with in turn.

**Responsibility for the course**

Because of the multidisciplinary nature of the course as well as the organization of the university according to a unidisciplinary structure it was necessary to “house” the programme within one department of the university which would take ultimate responsibility for its implementation. As interdisciplinary cooperation is always difficult, even though often ideal, the department had to be chosen carefully. Initially the Department of Community Health was unanimously agreed upon as the coordinating parent-to-be but staff changes and a simultaneous lack of financial resources made the change of proposed residence to the equally acceptable Department of Obstetrics and Gynaecology necessary.

**Admission requirements**

A major problem emerged as it soon became obvious that childbirth education is essentially an interdisciplinary field and should therefore admit students to its training programmes from many disciplines. However, no existing undergraduate course offered at this university covered all the relevant preparatory aspects. Complicating the matter even further was the current ruling of the South African Medical and Dental Council (SAMDC) – the professional affiliating body of medical and related practitioners – that only physiotherapists, occupational therapists and midwives may practise as childbirth educators in South Africa.

It was, however, agreed that students with undergraduate training in a wider range of disciplines should be admitted to the course to fulfil its multidisciplinary objectives, e.g. students from Medicine, Social Work and Psychology in addition to Nursing, Occupational Therapy and Physiotherapy. It was recognized that certain areas of the course would be familiar to each group
of students as a result of their previous training. The objective of the proposed diploma became to supplement the skills of the various categories of students in areas not covered by their undergraduate teaching. This could be facilitated by two approaches; the first was to allow students the opportunity to obtain a full exemption from one of the five basic courses being offered in the first or second year on the basis of their undergraduate training. The second method was to emphasize seminars and group study techniques rather than didactic lecturing as the educational method of choice throughout the programme. It was believed that this method would encourage an interchange of information and skills between students from various academic and cultural backgrounds. Students would in fact draw heavily on their own resources for learning in this programme.

**Degree or diploma?**

A further major difficulty arose as in this country two methods of training for the nursing profession are offered: a degree route, which has limited student participation; and a diploma route which is the more commonly followed avenue. Those with nursing diplomas would normally be excluded from postgraduate study at university level. However, they can and do function as childbirth educators, and in fact, represent the largest group with the potential to fulfil the needs of the various communities requiring such education in South Africa. To overcome this difficulty admission requirements were adjusted so as to allow any person registered as a general nurse and midwife with the SAMDC, provided they had completed all years of secondary level schooling, to have access to the programme. In addition, to distinguish between the various levels of training of the degree and diploma nurses, degree nurses were exempt from the first year of the proposed Childbirth Education Diploma while diploma nurses were not. To meet this proviso the courses included in the first year of study closely approximated those subjects already covered in the undergraduate curriculum for degree nurses.

**Part-time vs. full-time training**

As it was recognized that potential candidates for this diploma would have, in all instances, completed at least four years of full-time study and may already be in professional practice it was agreed to offer the course on a part-time basis rather than full-time. This approach would allow simultaneous benefit from experience in the practice of their professional training while completing the course.

**Admission of non-degreed persons**

It is often argued that the primary prerequisite for effectiveness as a childbirth educator is the experience of motherhood. This assumption underlies the National Childbirth Trust childbirth education programme, for instance, and is no doubt a major, but perhaps not essential, contributory factor to success. However, motherhood is not and could not be conceived of, as a prerequisite for university entrance. Nor could exclusion from the programme on the grounds of personal inexperience in parenthood be considered at university level. Hence, both non-mothers and mothers were deemed free to enter the programme.

**Rural (traditional home births) vs. urban (hospital/clinic deliveries)**

In South Africa both rural home births attended by traditional birth attendants as well as hospital and clinic deliveries according to western medical approaches occur. It was agreed that while education regarding traditional home births would be offered in the programme, preparation for childbirth education in this setting would not be attempted. Firstly, the divergent background, skills and practical experience could not easily be incorporated into a single course. Secondly, rapid urbanization is taking place in South Africa with a concomitant increase in the proportion
of urban/hospital births. This was therefore seen as the priority area. Thus the proposed diploma was aimed at preparation for birth within a western-oriented medical system, from a multiculture perspective including white, black, Asian and coloured (mixed racial origin) peoples.

**The need for the diploma**

In the process of developing the diploma the perceived need for it was called into question. Academically it was acknowledged that existing undergraduate training in physiotherapy, occupational therapy and nursing all covered aspects of the expertise required of childbirth educators to a greater or lesser extent, but it was also accepted that much was being omitted from these programmes. It was also recognized that no formal training of childbirth educators either within or without the university setting was being undertaken in this country.

On a practical level it was thought that the need for childbirth preparation was probably linked to the number of births occurring. Figures available for the major hospitals and clinics surrounding the University of the Witwatersrand during 1985 indicated that approximately 60 000 births had taken place. Of these births approximately 43 500 were black, 4000 coloured, 1500 Asian and the remaining 11 000 white. Figures were, however, not available regarding the percentage of women attending existing childbirth preparation programmes, although it was believed that attendance at such programmes was low (25% to 40% at best).

In order to give some insight into the perceived need for the proposed course professionals working in the field of childbirth education as well as final year students in various potentially participating professions were asked to complete a questionnaire regarding the perceived need for the diploma as well as their potential enrolment in such a course. Responses suggest an overwhelming majority in favour of the proposed diploma with a smaller number indicating potential enrolment (Table 1).

**Professional recognition**

While academic training for childbirth education was perceived as necessary, the need to obtain professional recognition of this training by such bodies as the SAMDC and the nursing and physiotherapy registration councils at least, was also acknowledged. It was agreed that the academic programme be instituted in the first instance with simultaneous requests for recognition by the various councils.

**Birth**

While the pregnancy has been long and sometimes complicated extending over a period of four to five years, labour is proving to be even more difficult. The programme at present has been approved on all academic levels of the university. However, financial constraints do not allow birth to take place. The delivery is being further obstructed by the economic constraints evident in the country which are limiting the sources of funding that can be appealed to from “outside” the university e.g. the economic sector.
Table 1  Responses to the questionnaire exploring the need for a Diploma in Childbirth Education

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<th>Professional groups</th>
<th>Is proposed course needed?</th>
<th>Probability of registering for the course*</th>
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<td>Occupational therapists</td>
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<tr>
<td>and Parenthood</td>
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<tr>
<td>4th year physiotherapy:</td>
<td></td>
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</tr>
<tr>
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<td>13</td>
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<tr>
<td>3rd year Occupational Therapy:</td>
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<td>Witwatersrand</td>
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<tr>
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<td></td>
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<tr>
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<td>University of OFS</td>
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<tr>
<td>University of Pretoria</td>
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<td>9</td>
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<td>4th year B.G. Alexander Nursing</td>
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<td>121</td>
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<tr>
<td>Total</td>
<td>433</td>
<td>360</td>
</tr>
</tbody>
</table>

* Figures do not always tally due to failure to respond to some questions
† NA, not available

It must be noted that the above responses are based on an original proposal to offer the course as a 1-year full-time course. However, frequent responses to the questionnaires indicated that the response rate would be even more favorable if the course could be offered on a part-time basis. Many requests to open the course to centers other than the Johannesburg area were also received.
Conclusion

It is sincerely hoped that this infant will not be stillborn. While delivery is proving slow, efforts to augment the birth are continuing. In the meantime it is hoped that onlookers can benefit from the experiences and developments that have taken place to date.

Acknowledgements

The support of the following in the care of this infant from planning, through conception and into delivery are gratefully acknowledged: Professor Peter Bundred (Family Medicine), Professor Marge Concha (Occupational Therapy), Ms Trish McInerney (Nursing Education), Mrs Pat de Witt (Occupational Therapy), Mrs Brenda Kastell (Physiotherapy) and Mrs Avis Schreler (Community Paediatrics) who served on the original committee. Thanks are also due to the delivery team of Professor Barbara Robertson (Nursing Education), Professor J. Beenhakker and Mrs Lynn Thompson (Physiotherapy), Professor Brian McKendrick and Dr Welma Hoffmann (Social Work), Professor Trefor Jenkins and Dr Cardy (Human Genetics), Professor Phillip Toblas (Anatomy), Professor Alan Rothberg (Department of Paediatrics and Child Health), Professor Duncan Mitchell, Professor Graham Mitchell, and Professor Helen Laburn (Physiology), Professor Ernic Sonnendecker (Obstetrics and Gynaecology), Professor Paul Fatti (Statistics), Professor Andy Andrews (Business School), Professor John Gear (Community Health) and Mrs Anita Tjallinks, Ms Karen Hansen, Ms Gall Davidson and Ms Penny Giemre (Childbirth Educators) for their various contributions to the birth of this programme.

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Appendix

Educational objectives

On completion of this course on childbirth education the student should:

1. Be able to prepare prospective parents for the physical, behavioural and emotional aspects of becoming a parent.
2. Be able to plan, organize and institute a training programme for parents during the antenatal and postpartum periods.
3. Be able to use appropriate teaching techniques suitable for preparing couples for parenthood, e.g. lectures, group discussions, role-plays etc.
4. Have an adequate knowledge of the anatomy and physiology related to pregnancy, birth and the postpartum period.
5. Have an adequate knowledge of the psychological changes involved in both parents during the antenatal, birth and postpartum period.
6. Have an adequate knowledge of the impact of the birth of a baby on family life, both nuclear and extended.
7. Have an adequate knowledge of nutritional needs of mothers during the antenatal and postnatal periods.
8. Have an adequate knowledge of infant care in the first year of life, including psychological, physical and nutritional needs.
9. Have an adequate knowledge of infant and child development.
10. Be able to advise and assist mothers with breast and bottle-feeding practices as well as
general mothercraft skills.
11. Be fully familiar with obstetric techniques used in pregnancy and childbirth for both
normal and complicated pregnancies and deliveries.
12. Have observed deliveries by various methods (where applicable), e.g. natural childbirth,
Caesarean section, epidural anesthesia births, forceps deliveries, vacuum extraction etc.
13. Be familiar with various approaches to childbirth as practised at different birth centres, e.g.
hospital and clinic, private and state, and urban and rural.
14. Have an understanding of variations in psychological, physical and behavioural approaches
to pregnancy, childbirth and early parenthood among parents with different ethnic/cultural
backgrounds.
15. Be able to conduct exercise classes antenally and postnatally and have a realistic
understanding of the value of exercise in preparation for birth and the postpartum period.
16. Be conversant with various methods of pain relief in labour, e.g. breathing techniques,
relaxation, hypnosis, analgesia and anesthesia.
17. Be able to counsel and assist parents of infants with abnormalities and to be aware of
helping associations available for such families.
18. Be able to offer counsel to parents whose pregnancies end in miscarriage or stillbirth and
to be aware of helping organizations available to assist such families.
19. Be able to offer basic counselling to parents as well as to recognize when their skills are
inadequate and when referral is needed.
20. Be conversant with emotional problems arising during pregnancy and the puerperium, e.g.
postnatal psychoses, neuroses (depression) and the blues.
21. Have an adequate knowledge of marital counselling and available resources in this area.
22. Have an adequate knowledge of human genetics and genetic disorders.
23. Have an adequate knowledge of family planning.
24. Be familiar with the specialized care of the “at risk” mother and infant.
25. Have a working knowledge of first aid particularly as it applies to pregnancy, birth and the
postpartum period.
26. Have an adequate knowledge of hospital and clinic routines during pregnancy, birth and
the postpartum period.
27. Be familiar with obtaining medical and obstetrical histories which might influence current
or future pregnancies.
28. Have an adequate knowledge of adoption procedures and their impact on parents.
29. Have an adequate knowledge of community care, e.g. immunization requirements, home
visit facilities etc.
30. Have an adequate knowledge of the history of childbirth education and obstetrics.
31. Be aware of the ethical codes of conduct for professionals in this area.
32. Have some knowledge of business management relevant to practising as a private
childbirth educator.
Module 6. Reading
Sexuality during pregnancy

Pregnancy and parenthood will bring many changes in your life and some of these changes involve the relationship with your partner. Sexuality is an important part of this relationship and remains so during pregnancy and after your baby is born. It not only includes genital sex but also the feelings and beliefs about yourself and your relationship with your partner. Becoming parents allows many opportunities for you to learn more about yourself and your partner. Talking with each other and being aware that the changes you experience are normal and okay can help make this stage in your life a positive and happy one.

For many women, feelings about lovemaking change during pregnancy. Some feel more sensuous and are more aware of their bodies than they have ever before. Other women notice that sexual interest drops early in pregnancy. This may be due to fatigue and nausea. Interest may increase in the second three months and then fall again at the end of pregnancy. (Although cuddling and hugging may be desired throughout pregnancy.) Others find that sexual feelings continuously decrease throughout the pregnancy. What each woman feels is different but very normal.

Men’s feelings about sex may also change when their partners become pregnant. Some men worry that intercourse will harm the baby or will start labour prematurely. Neither is true. For some men, their partner’s changing shape is attractive. Other may be uncertain as to how they feel. Some women may fear that their partners are repulsed by their pregnancy.

Although each partner may react differently to pregnancy, a common desire is for physical closeness – touching, hugging and cuddling. During pregnancy, many women also prefer lovemaking that is gentle. Talking with each other and sharing these feelings are good ways to try and meet each other’s needs and avoid misunderstandings.

Couples can enjoy sex throughout pregnancy since the penis cannot touch the uterus where the baby is well protected in the bag of waters. Labour will only begin after intercourse if it is ready to start. As a woman’s shape changes, couples need to try different positions during intercourse. The position of partner on top is the least comfortable for women. More suitable positions include (see diagrams):

- partners lying on their sides (front to front; front to back)
- woman on top
- partner on top but placing weight on hands or elbows
- partner entering vagina behind.

Stroking, massage, and bringing each other to orgasm using your hands or mouth are other ways of expressing sexual feelings and bringing pleasure to each other. Pregnancy provides a good opportunity to be creative in your lovemaking.

While sexual activity can be continued throughout a healthy pregnancy, you may be advised to avoid intercourse if:

- You have any bleeding or pain
- Your membranes or bag of waters rupture
- You may have a history or risk of miscarriage.
Avoid intercourse if you have any of these signs until you can consult your clinic or doctor. One should also avoid blowing air into vagina as this may cause an embolism.

**After the baby…**

Many women find they have little interest in sex after they’ve had a baby. Sexual feelings do return but the timing is different for everyone. Many women have the most intense feelings for their babies. Lack of sleep, frequent feedings, listening for the baby and a sore vaginal area tend to create more barriers to intimacy and make you feel less sexy.

The vaginal walls in nursing mothers are thin due to lower estrogen levels. This results in a dry or tight feeling during intercourse. Worrying that sex will hurt does not help either of you to relax. If you are both ready to, you can resume intercourse when the bleeding has stopped and the healing is complete (about four weeks). Here are a few suggestions that can help you get back to enjoying sexual intimacy.

- Be patient.
- Plan times to be together when you are rested and the baby is least likely to disturb you.
- Hug and kiss each other – it is important to be affectionate.
- Go slowly when resuming sexual activity. Avoiding penetration (the penis entering the vagina) the first few times helps reduce the anxiety about “getting back to normal”.
- Positions in which the woman can control the depth of penetration (e.g. woman on top) may be more comfortable.
- Apply a water-soluble gel such as K-Y jelly to the penis and entrance to the vagina to make intercourse more comfortable.
- Talk to each other about how you are feeling – say what feels good and what doesn’t.

**If you are breastfeeding…**

Some women experience sexual feelings or orgasm while breastfeeding. Some women don’t. Either feeling is perfectly normal. Relax and let the feelings be.

During sex a woman’s breasts may leak milk when she is aroused. Again, this is normal. Some women and men have conflicting feelings about the breasts’ dual function. Let your partner know how you feel.

Remember, you can get pregnant even though you have not had a period. Although periods are delayed in women who breastfeed, breastfeeding is not a reliable method of birth control. Use of a condom and foam is a very good method for many because of its effectiveness and safety. It can also be used until you visit your clinic or doctor.

A loving sexual relationship during pregnancy and after the baby is born is healthy for both of you – as lovers and partners. Caring for yourselves and each other strengthens your ability to care for your baby.

For further information contact Prenatal and Parenthood Education Services or your local Health Department.
MODULE 7.
ANAEMIA IN PREGNANCY

At the end of this module participants should:

- recognize the severity of anaemia as a problem during pregnancy
- understand the latest thinking on anaemia in pregnancy
- recognize the importance of folic acid in pregnancy
- be aware of how to prevent anaemia in pregnancy
- know how to treat anaemia in pregnancy.

Reading:
Anaemia (please read prior to the session)

Anaemia

In a healthy pregnancy there are considerable changes in the composition of blood brought about by an increase in total blood volume and haemostatic changes which help to prevent haemorrhage at delivery. Plasma volume increases by at least 40% and there is an increase in red cell mass of 18–25%, providing the iron status is normal. This affects the haemoglobin level which reaches a physiological low at 32 weeks’ gestation. In women with good iron stores the haemoglobin returns to a normal level within two to three weeks postpartum.

Some authors are critical of the application of an absolute cut-off point (such as 110 g/l) for the level of haemoglobin that warrants a diagnosis of anaemia. They argue that this is physiologically unsound, since the measurement of haemoglobin is only one factor in the diagnosis of anaemia. In addition, it should be noted that the normal haematological adaptations of pregnancy are frequently misinterpreted as evidence of iron deficiency that needs correcting. Routine iron supplementation raises and maintains serum ferritin above 10 µg/litre and results in a substantially lower proportion of women with a haemoglobin level below 10 or 10.5 g percent in late pregnancy. As yet, neither iron or folate supplementation after the first trimester have shown any positive effect on a number of substantive measures of maternal or fetal outcome including proteinuric hypertension, antepartum haemorrhage, postpartum haemorrhage, maternal infection, preterm birth, low birth weight, stillbirth or neonatal morbidity. Women do not necessarily feel any subjective benefit from having their haemoglobin concentration raised. There is also no evidence to support the claim that women might be in a stronger position to withstand haemorrhage. In fact, the contrary might be true in that women with low haemoglobin might better withstand a loss of blood due to a higher circulating blood volume. There is documented U shape relationship between haemoglobin values and birth weight and preterm delivery. Lower and higher haemoglobin values increase the odds for low birth weight in a dose related fashion (Kolsteren P.W., Safe Motherhood Strategies: a Review of the Evidence 2001). Evidence suggests that except for genuine (severe) anaemia (below 70 gm/1000 ml) the best reproductive performance is associated with levels of haemoglobin that are traditionally regarded as pathologically low (Enkin 1996). It appears that unless there is evidence of iron deficiency from other measures a low haemoglobin level should not necessarily be regarded as sufficient grounds for routine supplementation.

Anaemia in pregnancy, if very severe, may be a cause of maternal mortality and should be treated.
GROUP WORK
On the basis of your own experience in practice, how often do you encounter anaemia in pregnancy? What are the main causes and types of anaemia in your area?

**Causes of anaemia in pregnancy**

Causes of anaemia in pregnancy include:

- iron and folate deficiency
- haemoglobinopathies, which include thalassaemias and sickle cell disease
- malaria
- parasitic infections.

**Iron deficiency anaemia**

Iron deficiency anaemia is the most common form of anaemia in pregnancy. Causes include:

- increased utilization
- dietary deficiency
- poor absorption of iron.

Iron is found in food substances of both animal and vegetable origin. Iron in meat is easily available for absorption. Iron in vegetables exists in a ferric state rather than the usable ferrous condition, and therefore requires conversion before it can be readily absorbed. Dietary advice from the care giver is essential and should encourage the woman to eat foods containing iron while avoiding the simultaneous intake of foods and drinks (such as tea) which limit the absorption of iron.

**Folic acid deficiency**

Folic acid is important in tissue growth. Deficiency in folic acid is common in some countries where women may have frequent pregnancies or where the dietary intake is low in folic acid. Folate is found in green vegetables such as cabbage and spinach. Folic acid is extremely sensitive to heat, so most is lost in cooking; the care giver should advise the woman about cooking food rich in folic acid. Blood film will demonstrate megaloblastic red cells which are immature.

**Haemoglobinopathies**

Haemoglobinopathies are inherited variants of haemoglobin where the globin chain is incorrectly synthesized (thalassaemia) or is structurally abnormal (sickle cell anaemia and other variants).

GROUP WORK
Make a list of the effects of anaemia on maternal health. Are there any effects on the fetus? If so, what are they? What are the effects on the postpartum woman? Be prepared to discuss your findings with the group.

Severe anaemia in pregnancy has significant effects when the haemoglobin concentration is low enough to reduce maternal arterial oxygen saturation and subsequent delivery of oxygen to the fetus. The fetus attempts to adapt through increased uterine and fetal blood flow, redistribution of blood within the fetal organs, and increased production of red blood cells in an effort to increase the total oxygen-carrying capacity.
The tools available to diagnose anaemia must be reliable. It is important that the degree of severity is assessed as well as monitoring any response to treatment.

It is recommended that the Hb level of all pregnant women should be estimated at the booking visit and again at 32 weeks’ gestation (earlier if there are any clinical signs of anaemia). The haemoglobin level is assessed by two methods, clinical screening, which involves estimating paleness of conjunctivae, skin and nail beds (although this is not very sensitive), plus actual measurements of the haemoglobin concentration, using the Tallqvist or the copper sulfate method, the latter being the most accurate.

Methods for assessing the degree of anaemia also include measurement of the haematocrit/packed cell volume (PCV). Dilution techniques and haemoglobinometers, if available, can be used in primary health care settings.

**Effects of anaemia on the condition of the mother**

The effects of anaemia may include:
- listlessness, tiredness and loss of energy
- pallor of the mucous membranes
- palpitations in extreme cases.

**GROUP WORK**

How do you assess the degree of anaemia in women in your care?
What tests/techniques are available to assess the severity of the condition?
How often do you check the Hb level during pregnancy?
What levels of Hb do you regard as indicative of anaemia? Are these levels appropriate in the light of current knowledge?

Make notes of your discussions and ask one member of the group to feed your points back to the whole group.

**Prevention of anaemia**

The commonest cause of anaemia in pregnancy is iron or folate deficiency. This is compounded by short birth intervals, HIV infections, hookworm schistosomiasis or other parasitic diseases.

Iron and folate deficiency is mainly nutritional in origin, so it is very important that midwives and other health professionals give correct nutritional advice which is culturally sensitive to the client group. Midwives must encourage the pregnant mother to take appropriate iron and folate supplements if needed. Considerable care has to be taken in ensuring that compliance is achieved. This means that midwives and other professionals present the supplementation programme in an acceptable way to the women. It must be recognized that a woman’s belief systems and her knowledge and perceptions of health will strongly influence her decision whether to comply with advice regarding medication.

In 1993, WHO strongly recommended the following protocol during pregnancy:
midwives and other health care professionals should be trained to give advice on dietary intake and to recognize anaemia and to take appropriate action;

facilities should be available for estimating haemoglobin concentration levels accurately;

iron, folate and vitamin C (where appropriate) supplements should be available for pregnant women;

facilities should be available for screening for parasitic and malarial conditions;

malaria should be controlled in affected areas;

appropriate referral systems should be in place.

GROUP WORK
In small groups, discuss how you advise your client group about dietary requirements. Make some pointers to raise in the final plenary discussion.

**Causes and treatment of anaemia**

Treatment of anaemia depends on the cause. Table 7.1 depicts the various causes of anaemia and their appropriate treatments.

<table>
<thead>
<tr>
<th>Causes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron deficiency (commonest) Depletion of iron stores</td>
<td>* Dietary investigation</td>
</tr>
<tr>
<td></td>
<td>* History of previous anaemias</td>
</tr>
<tr>
<td></td>
<td>* Supplementation regime</td>
</tr>
<tr>
<td>Folate deficiency Depletion of folate stores because of inadequate diet</td>
<td>* Dietary investigation and supplementation regime</td>
</tr>
<tr>
<td>Thalassaemia (inherited disorder) Alpha (minor)</td>
<td>* Screening</td>
</tr>
<tr>
<td></td>
<td>* Iron supplementation/transfusions</td>
</tr>
<tr>
<td></td>
<td>* Rare, unlikely to reach childbearing age</td>
</tr>
<tr>
<td></td>
<td>* Transfusions</td>
</tr>
<tr>
<td>Sickle cell (inherited disorder) Trait Positive</td>
<td>* Screening</td>
</tr>
<tr>
<td></td>
<td>* Education of parents for risks</td>
</tr>
<tr>
<td></td>
<td>* Ensure, during labour, that the mother does not develop dehydration or severe hypoxia which may precipitate a crisis</td>
</tr>
<tr>
<td>Malaria</td>
<td>* Chemoprophylaxis, depending on local policy</td>
</tr>
<tr>
<td></td>
<td>* Personal protection, bed nets and vector control</td>
</tr>
<tr>
<td>Other parasitic infections</td>
<td>* Albendazole or mebendazole</td>
</tr>
<tr>
<td></td>
<td>* Education and advice to avoid reinfestation</td>
</tr>
</tbody>
</table>

GROUP WORK
Do you have clients with inherited disorders, haemoglobinopathies? What methods are available to you to diagnose such conditions? How would the case be managed?

**Summary and conclusion**

Anaemia in pregnancy remains prevalent in some populations and is an important contributor to maternal mortality and morbidity. The aetiology of anaemia is now well understood and there is
general agreement on prevention strategies. Problems still exist in some countries where there are inadequate facilities for screening, lack of adequate training of health care professionals, poor compliance by pregnant women with instructions to take appropriate preventive measures and/or supplements, and inadequate referral systems.
Module 7. Reading

Anaemia

Anaemia is a deficiency in either quality or quantity of red corpuscles in the blood. There is debate about the level of haemoglobin below which anaemia may be diagnosed in pregnancy.¹ WHO regards 11 g/100 ml as being the threshold for anaemia.² Current research suggests, however, that this level does not pose a physical problem in pregnancy and may even constitute physiological adaptation to the state of pregnancy.

Several authors are critical of the concept of a fixed haemoglobin threshold below which anaemia is diagnosed. They argue that this is physiologically unsound, since measurement of haemoglobin is only one factor in the diagnosis of anaemia. Against this we must clearly recognize that severe pregnancy anaemia (see below) in less developed countries is a major cause of maternal mortality.³, ⁴

Assessment of haemoglobin concentration

Haemoglobin levels may be difficult to estimate in developing countries, making clinical screening for anaemia extremely important. Although clinical signs may be considered subjective and less sensitive, they can still aid clinicians in their diagnosis. Signs include paleness of conjunctivae, skin and nail beds, and symptoms of severe anaemia might include tiredness and shortness of breath.

Two quick and simple tests are the Tallquist test and copper sulphate method. These tests use a finger-prick method of collecting blood. They are easy to carry out and results are rapid, visible and suitable for clinicians working in rural areas.

Major obstetric units use more sophisticated and expensive methods, but the technology used may not be applicable to developing countries as the machinery may require skilled technicians to provide frequent maintenance and to ensure correct calibration. However, it is clear that successful management of anaemia in pregnancy depends on reliable techniques for the detection of anaemia, with subsequent reliable monitoring of the response to treatment.

Definitions: degrees of anaemia⁵

<table>
<thead>
<tr>
<th>Grades</th>
<th>Range (g/100 ml)</th>
<th>Haematocrit (packed cell volume) (%)</th>
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</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>7.0–10.9</td>
<td>24–37</td>
</tr>
<tr>
<td>Severe</td>
<td>4.0–6.9</td>
<td>13–23</td>
</tr>
<tr>
<td>Very severe</td>
<td>&lt;4.0</td>
<td>&lt;13</td>
</tr>
</tbody>
</table>

Causes of anaemia in pregnancy

The most common causes of anaemia in pregnancy are:

- iron and/or folate deficiency
- haemoglobinopathies, which include:
  - thalassaemias
  - sickle cell disease
  - malaria.

Iron deficiency anaemia

Iron deficiency anaemia is the most common form of anaemia in pregnancy. Generally this form of anaemia is preventable or easily treated with supplements. Its causes include:

- increased utilization
- dietary deficiency
- poor absorption of iron
- short intervals between births.

Iron occurs in foods of both animal and vegetable origin. Iron in meat is easily available for absorption. Iron in vegetables exists in a “ferric” state rather than the usable “ferrous” condition; therefore it requires conversion (chemical “reduction”) before it can be readily absorbed. Vitamin C aids the intestinal absorption of iron.

Normal haematological (physiological) changes in pregnancy can make diagnosis difficult.

Haemoglobin levels below 10.5 g/100 ml in the second and third trimesters require further investigation. Blood film results will show microcytic cells (small) which are less efficient in oxygen transportation.

Daily iron requirements increase during pregnancy. These are either met by increased intestinal absorption or by mobilization from iron stores in the body. It follows that if these two sources are insufficient, iron deficiency will result unless supplements are given. Various factors affect the absorption of iron. Certain foods such as meat and fish contain iron in ferrous form, which is more easily absorbed. Other foods with a high iron content include eggs and green leaf vegetables. Citrus fruits (oranges, grapefruits, etc.) or fruit juices containing vitamin C help iron absorption by aiding reduction of dietary iron from the ferric to the ferrous state. Other substances (such as tea and coffee and diets high in cereals/phytate) may have the reverse effect and prevent or slow down iron absorption.

Care givers play an important role in giving dietary advice to pregnant women. They should encourage efforts to enhance absorption from alternative foods such as pulses/beans and other dark green vegetables and fruits, particularly when, as in many communities, vegetables and fruits are eaten only infrequently and in small amounts.

In some countries iron supplementation of food is practised. A widely consumed food should be selected and fortified with iron in a form that is adequately absorbed. Bread, milk, salt and sugar are the products most commonly used, with some success.
The effects of maternal iron deficiency anaemia on the fetus and neonate are unclear. Usually, even with significant maternal iron deficiency, the fetus will be protected and receive adequate stores at the expense of the mother. Very severe maternal anaemia may result in the fetus having decreased red blood cell (RBC) volume, lowered haemoglobin, reduced iron stores and cord ferritin levels, with an increased risk of iron deficiency in infancy.

It should be noted that the normal haematological adaptations of pregnancy are frequently misinterpreted as evidence of iron deficiency that needs correcting. Routine iron supplementation raises and maintains serum ferritin above 10 µg/litre and results in a substantially lower proportion of women with a haemoglobin level below 10 g or 10.5 g/100 ml in late pregnancy. As yet, neither iron or folate supplementation after the first trimester have shown any positive effect on a number of substantive measures of maternal or fetal outcome, including proteinuric hypertension, antepartum haemorrhage, postpartum haemorrhage, maternal infection, preterm birth, low birth weight, stillbirth or neonatal morbidity. Women do not necessarily feel any subjective benefit from having their haemoglobin concentration raised. There is also no evidence to support the claim that treated women might be in a stronger position to withstand haemorrhage. In fact, the contrary might be true, in that women with a low haemoglobin level might be better able to withstand a loss of blood due to a higher circulating blood volume. Evidence suggests that, except for genuine anaemia, the best reproductive performance is associated with levels of haemoglobin that are traditionally regarded as pathologically low (Enkin M. et al. 1996). It appears that unless there is evidence of iron deficiency from other measures a low haemoglobin level should not necessarily be regarded as sufficient grounds for routine supplementation.

**Folic acid deficiency**

Folic acid is important in tissue growth. Deficiency in folic acid is common in some countries where there may be frequent pregnancies and dietary intake is low. Folate is found in green vegetables such as cabbage, spinach, etc. Folic acid is extremely sensitive to heat, so most is lost in cooking. The care giver should therefore advise the woman about the method of cooking food rich in folic acid.

Blood film results will demonstrate megaloblastic (large) red cells, which are immature and less efficient in oxygen transportation.

Folate demands increase threefold during pregnancy. Since folic acid is essential for DNA synthesis and cell duplication, folate is needed for growth of the fetus and placenta as well as for maternal RBC production. Folate requirements increase throughout pregnancy and are higher in multiple pregnancy. Folate supplementation during pregnancy may be necessary if dietary intake is inadequate.

Severe folic acid deficiency has been associated with fetal malformations such as neural tube defects, prematurity and low birth weight. Fetal folate deficiency is very rare; the fetus has elevated folate and folate protein-binding levels which protects against folate deficiency.

**Malaria**

Malaria is a major contributor to severe anaemia in women living in endemic areas.

Because of the adverse effects of malaria during pregnancy, WHO has recommended initial treatment followed by chemoprophylaxis for pregnant women in malarial regions. This is most effective before the nineteenth week of pregnancy. Chloroquine is the most frequently used drug
for this purpose, but increasing drug resistance has greatly reduced its efficacy. All staff are therefore advised to follow the relevant national policies and protocols that have been drawn up in malarial areas.

**Haemoglobinopathies**

Haemoglobinopathies are inherited variants of haemoglobin where the globin chain is incorrectly synthesized (thalassaemia) or is structurally abnormal (sickle cell anaemia and other variants).

**Sickle cell:** This disorder affects the structure of the beta-chain in the haemoglobin anaemia molecule. A woman with sickle cell anaemia normally has a lower haemoglobin level of 7–8 g/100 ml and a reduced oxygen-carrying capacity to which her system has adjusted. Pregnancy places both the woman and fetus at greater risk of complications. As the plasma volume increases during pregnancy she becomes more anaemic. In addition she may experience an increased frequency of sickling crises.

Sickle cell crises are triggered by physical or emotional stress, which may be caused by infection, hypoxia, trauma and indeed pregnancy itself. Crises in pregnancy may be related to the hypercoagulable state, vascular stress or increased susceptibility to infection. In women with sickle cell anaemia, tissue deoxygenation or acidosis triggers structural changes in the sickle haemoglobin (HbS) so that the RBCs take on a half-moon or sickle appearance. The sickled cells can obstruct blood flow in the microvasculature. Areas most susceptible to obstruction are those where the blood flow is slow, such as the spleen, bone marrow and, in pregnancy, the placenta. Obstruction leads to venous stasis, further deoxygenation, platelet aggregation, hypoxia, acidosis, further sickling and eventually infarction. The fetus may be affected, resulting in fetal hypoxia due to obstruction of the blood flow within the placenta. This loss of functional placental tissue interferes with the exchange of oxygen and nutrients. Frequent maternal sickling crises may result in severe placental infarctions (necrosis). Fetal death is due to placental infarction and fetal hypoxia.

Fetal and neonatal mortality are increased with a higher incidence of stillbirth and intrauterine growth retardation (IUGR).

**Thalassaemia:** This is a disorder in the synthesis of either the alpha or beta peptide chains of the haemoglobin molecule, which leads to alterations in the fragility of RBC membrane and decreased RBC life span. Beta-thalassaemia minor (in which the abnormal gene is only found on one chromosome – the heterozygous state) is the more frequently encountered during pregnancy. Females with Beta-thalassaemia major (Cooley’s anaemia, when the abnormal gene is found on both of the chromosomes – the homozygous state) usually die in childhood or adolescence. If they do survive, they are usually infertile. Women with Beta-thalassaemia minor are mildly anaemic but generally otherwise healthy. Analysis of blood values will indicate a mild hypochromic microcytic anaemia. In some cases blood transfusion may be necessary. Iron supplementation is best avoided in these cases, as it is associated with increased morbidity.
**Parasitic infections**

In areas of high prevalence of hookworm, schistosomiasis or giardiasis, all pregnant and lactating women should receive a single-dose oral anthelminthic treatment, albendazole or mebendazole. The medication is dangerous for the fetus, so if possible the anthelminthic treatment should be avoided in the first trimester of pregnancy, unless absolutely necessary.

**Prevention of anaemia**

Anaemia in pregnancy may be reduced by:
- advice from care givers on dietary intake;
- taking blood for haemoglobin levels in pregnancy;
- iron and folate supplementation regime, when indicated;
- control of malaria;
- screening for inherited variants of haemoglobin;
- screen for infestation from parasite or hookworms, etc.;
- (WHO’s recommendation) administering one tablet of 60 mg elemental iron with folic acid 0.5 mg twice a day for at least 90 consecutive days, or following the national protocol where this is available.

**Effects of anaemia**

The effects of anaemia include:
- listlessness, tiredness and loss of energy
- pallor of the mucous membranes
- palpitations and shortness of breath in extreme cases.

**Summary chart**

Treatment of anaemia depends on the cause. The following table depicts the various causes of anaemia and their appropriate treatments.

<table>
<thead>
<tr>
<th>Causes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron deficiency</td>
<td>Dietary investigation by midwife</td>
</tr>
<tr>
<td></td>
<td>History of previous anaemias</td>
</tr>
<tr>
<td></td>
<td>Encourage supplementation regime, including Vitamin C; avoid tea/coffee</td>
</tr>
<tr>
<td>Folate deficiency</td>
<td>Dietary investigation and supplementation regime</td>
</tr>
<tr>
<td>Thalassaemia</td>
<td>Screening</td>
</tr>
<tr>
<td>Alpha minor (rare)</td>
<td>Iron supplementation/transfusions</td>
</tr>
<tr>
<td>Alpha + major (very rare)</td>
<td>Very unlikely to be fertile</td>
</tr>
<tr>
<td>Beta minor</td>
<td>Unlikely to require treatment</td>
</tr>
<tr>
<td>Beta major</td>
<td>Iron supplementation/transfusions</td>
</tr>
<tr>
<td>Malaria and other parasitic infections</td>
<td>Chemoprophylaxis</td>
</tr>
<tr>
<td></td>
<td>Personal protection, bed nets and vector control</td>
</tr>
<tr>
<td></td>
<td>Albendazole or Mebendazole</td>
</tr>
<tr>
<td>Sickle cell trait positive</td>
<td>Screening</td>
</tr>
<tr>
<td></td>
<td>Education of parents for risks</td>
</tr>
<tr>
<td></td>
<td>Ensure the mother does not develop dehydration or severe hypoxia during labour</td>
</tr>
</tbody>
</table>
Severe anaemia contributes to maternal death and, where possible, it should be corrected or treated antenatally.

At the end of this module participants should:

- know what factors are essential in an effective referral system
- know what skills are required by personnel at each level of the referral system
- consider the application of a good referral system to the treatment of bleeding in pregnancy
- know the principles of management of bleeding in pregnancy.

Reading:
Referral system for antepartum haemorrhage

Reference:
Mother-baby package (WHO 1994)

**Importance of an effective referral system**

It is important to have a referral system for mothers and babies during pregnancy and childbirth because complications arising in pregnancy, labour and the time immediately following labour are sometimes impossible to predict. Such complications can arise as an emergency and they or their results are hazardous to the health or even the lives of the mother and/or her baby. Often they occur with little warning and the speed with which they progress can be alarming.

For this reason it is essential that an effective system exists which will allow early detection and speedy referral to an appropriate place where action can be undertaken by health workers with the appropriate skills. Too often, for a variety of reasons, mothers in pregnancy and labour do not get the care they need when they need it. Maine and colleagues demonstrated this in their work on maternal mortality and devised what is now called the Three Delay Model (Figure 8.1) showing the three main times where delays often occur which then lead to the death of the mother.

**Figure 8.1 Three Delay Model**

Source: Maine 1990.
EXERCISE IN SMALL GROUPS

Look at the case study you did for the pre-course work and see if you can identify any points where there was a delay in the woman getting the appropriate care when she needed it. What action/care would have been more appropriate? Give feedback to the whole group.

You are most likely to have discovered from the above exercise that whenever a problem occurred which resulted in a maternal or prenatal death or near death, there was usually some delay in the mother and/or her baby getting the right care at the right time.

No health care system can provide all the equipment and staff for all eventualities at every level of the system. There are too many potential problems, and some situations arise so infrequently that the equipment would necessarily be under-used and the staff would not gain enough experience to maintain their skills. An efficient and speedy system of referral therefore needs to be in place to ensure that a woman and her baby can be sent to the site where the necessary skills and equipment exist, recognizing that skills will be greater the higher the level reached.

There are a number of key factors which are essential for a referral system to be effective.

- Communication networks must be established and function well.
- There must be efficient methods of transporting mothers to and between facilities.
- Policies must all be based on an integrated approach to health care (primary health care).
- Protocols must be established which are designed by the team and set out priority actions to be taken in any emergency.
- Standardized care plans have been drawn up.
- Professionals work as a team.
- All members of the team respect each other.
- Each team member’s role and responsibilities are clearly defined and written down; everyone knows what he/she should do.
- In-service (continuing education) programmes are established for all team members to learn or revise new techniques, systems or protocols together.
- Monitoring and evaluation systems are established and function correctly and all members of the team are involved in monitoring the systems.
- All maternal deaths or unexpected perinatal deaths are regularly audited with the aim of identifying weaknesses in the systems and recommending changes; this should involve the whole team and not be an occasion for finding fault, blaming each other or punishing offenders: it is more important to set up a system which improves care and prevents the same problem from happening again than just to blame someone who caused things to go wrong.
- The Mother-baby package (WHO 1994) and the Guidelines for establishing essential/emergency obstetric care (EOC) in Essential elements of obstetric care at first referral level (WHO 1991) should be followed.

Both the Mother-baby package and Care of the mother and baby at the health centre: a practical guide (WHO 1994) identify different levels of essential obstetric care. The Mother-baby package
establishes a systematic model for providing effective maternity health care (Figure 8.2). Health care provision can be seen to work at three levels:

- in the community
- at the health centre/health post
- at the district hospital.

Refer to Module 2.

There must be good communication and cooperation between all three levels for information to flow up and down the pyramid efficiently. WHO acknowledges that, “The key to success is to have the persons with midwifery skills at all levels of the health care pyramid” (Mother-baby package, WHO 1994, p. 13). A set of rules/protocols is required which establishes who is responsible for what at each level, and indicates what each health care professional should do at each level in the event of a problem being recognized. Personnel at each level should know under what conditions they should refer the mother and/or baby to the next level. Ideally each level should also know what will happen at the next level.

The Mother-baby package makes it clear there must be personnel with midwifery skills at each level, able to undertake appropriate essential obstetric care (EOC).

The skills required for administering essential obstetric care are listed below.

- Community level (first level EOC):
  - basic life-saving skills: airway, breathing and circulation (ABC);
  - good communication, interpersonal, observation and reporting skills (see session on home-based maternity records);
  - safe, hygienic and non-invasive delivery skills;
  - educational and health-promoting skills, including appropriate family planning methods and methods of contraception and promotion and assistance with breastfeeding;
  - immunization skills;
– emergency management of postpartum haemorrhage, including giving of an oxytocic drug and bimanual compression of the uterus.

- Health post/clinic (2nd level EOC): the skills required at community level plus:
  - supervisory skills;
  - use of appropriate technology, including vacuum extraction, use and repair of episiotomy;
  - giving of antibiotics;
  - manual removal of placenta;
  - provision of intravenous infusion (IVI), including use of plasma expanders.

- District level (full EOC): the skills required at health post/clinic level plus:
  - advanced life support skills, use of mechanical aids for ventilation and defibrillating;
  - operative deliveries, especially lower segment Caesarean section;
  - major gynaecological operations, including perennial repair;
  - blood transfusions.

**Practical application**

**Bleeding in pregnancy**

This is one of the most common reasons for referral. It may have many causes, some of which result in a serious emergency. In such cases medical assistance and speedy transfer to the site with the correct facilities is the only possible action that will save the life of the woman.

Causes of bleeding prior to birth (antepartum haemorrhage) include:
- unexplained early pregnancy blood loss probably from the decidua;
- threatened or actual miscarriage/abortion (most common before 12 weeks);
- after medically induced abortion (will depend on the law relating to abortion);
- self-inflicted abortion/attempts abortion (can occur at any time but most common early in pregnancy);
- placenta praevia (most common after formation of lower segment, any time but after 32 weeks, most commonly around 36 weeks and term);
- placental abruption (any time but most common 36 weeks to term);
- trauma and injury (any time);
- non-obstetric causes such as cervical erosion, polyps or cancer of the cervix.

The following case studies will help to consider the important action to be taken if bleeding occurs during the pregnancy.

**Case Study 1:**
The mother of a pregnant girl aged 16 years calls to her neighbour for help. The girl, who is now approximately eight months pregnant, has told her she is bleeding vaginally. She first noticed she
had passed some blood vaginally on getting up in the morning but thought it was normal. It is now mid-day, she is still losing blood vaginally and she is frightened.

**Case Study 2:**
A young woman has come to speak to the staff at the health post as she has noticed she is having short cramp-like pains in her abdomen and she thinks she may be three months pregnant. She has missed two menstrual periods. She noticed this morning she had passed some blood vaginally. She is not sure what she should do.

**GROUP WORK**
In small groups discuss each case study and try to answer the following questions:

- What are the possible causes of bleeding in each case?
- In case study 1, what should the neighbour do?
- In case study 2, what should the health worker at the health post do?
- What would you as midwife do in each case if you were the first person called into the home or the health post?

**The most probable cause of bleeding in Case Study 1**
Bleeding after 22 weeks of pregnancy from or into any part of the birth canal before the birth of the baby is called antepartum haemorrhage (APH). Bleeding prior to 22 weeks is usually referred to as bleeding in early pregnancy and may occur for the same reasons as APH, although a more likely cause is spontaneous or induced abortion/miscarriage. The figure of 22 weeks is arbitrary and the management of haemorrhage at any time in the antenatal period follows similar principles.

The bleeding in this case is likely to be due to a small degree of placental abruption or to a placenta praevia (see below). It is possible this is merely a “show” but the amount of blood loss suggests that that is rather unlikely.

**The most probable cause of bleeding in Case Study 2**
Bleeding in early pregnancy is usually symptomatic of an actual or threatened abortion. Frequently the true cause of the bleeding is not established and the pregnancy continues to term. Some studies suggest that the perinatal mortality rate is higher when there has been bleeding in early pregnancy.

Since the bleeding in Case Study 2 is accompanied by abdominal cramps, the likely cause is a threatened abortion/miscarriage. Diagnosis would be made by identifying (using a speculum) if the cervix was dilating. Signs of infection would be looked for, as septic abortion is a very serious condition. A careful history may indicate if the woman had tried to cause the abortion herself or had sought non-professional assistance.

**Management of bleeding in pregnancy**
The principles for the management of bleeding in pregnancy are:
- assess the degree of shock
- treat the shock (replace blood loss as appropriate)
- identify the cause of the bleeding
- treat the cause of the bleeding
All pregnant women should be informed early in their pregnancy that any amount of bleeding is abnormal, except for the “show”. Therefore any bleeding requires referral to someone with midwifery skills. A midwife should be called or the pregnant woman taken to the nearest health centre where maternity services are available. Speed is required even when only a small amount of blood is being lost – particularly in late pregnancy – since some of the haemorrhage may have been concealed (see under placental abruption below).

It is important to keep the woman calm, as anxiety may raise the blood pressure and cause further bleeding. She should not be given any food in case she has to have an anaesthetic later. However, it is advisable to give her sufficient fluid to prevent dehydration.

The main aim is to get the woman safely and speedily to a centre that can give her the right assistance.

**Management of bleeding due to abortion/threatened abortion in early pregnancy**

Research demonstrates that no one particular management protocol is more successful than another in dealing with threatened abortion. It appears that insisting on bedrest does not result in better outcomes, although it may be advisable for the woman to refrain from heavy work until cessation of bleeding.

If the woman’s condition is satisfactory and she is not showing signs of hypovolaemic shock a policy of observation may be adopted. If there is any degree of shock appropriate steps must be taken to treat it.

If she has had an abortion/miscarriage and the bleeding remains heavy, careful examination of the uterus must be undertaken, under general anaesthetic, to ensure that there are no retained products of conception.

Where there are signs of infection antibiotics must be commenced without delay as sepsis can be fatal to the woman.

Where a pregnancy ends in abortion the woman will require careful follow-up. Occasionally normal physiological responses to the ending of a pregnancy may occur, such as lactation. This can be psychologically very distressing and careful support may be required, along with appropriate advice regarding contraception.

**Management of bleeding in late pregnancy**

There are three major causes for bleeding in the latter part of the pregnancy.

**Bleeding from a low-lying placenta (placenta praevia)**

The placenta is situated in the lower part of the uterus either partially or wholly covering the cervical os. The low insertion results in instability of the attachment to the uterus and easily disrupted placental vessels. Unpredictable bleeding may spontaneously occur, usually not in response to trauma (although intercourse can sometimes provoke bleeding). The bleeding may be extremely heavy, particularly in the last few weeks of pregnancy, but is usually painless.
The degree of shock is directly related to the amount of blood loss. Frequently diagnosis is made by seeing the placental site on ultra sound scan (USS). However, sometimes where there is no USS facility, diagnosis is made on clinical signs possible aided by visualization of the placenta through the partially dilating cervix using a speculum. Extra caution should be exercised when visualizing the cervix and in no instance should a finger or instrument be placed in the cervix.

**Bleeding from a normally situated placenta (placental abruption)**
In these cases the placenta – usually for unknown reasons – separates partly or completely from the implantation site in the uterine wall and bleeding follows. This may occasionally occur as a result of some trauma or injury, for example a fall or motor vehicle accident, and in some cases maternal hypertension is thought to play a part.

Most commonly the bleeding is accompanied by abdominal pain which may be very severe.

A major clinical problem with a placental abruption is that bleeding may be concealed behind the placenta and the degree of blood loss can be seriously underestimated. A mother may present with signs of severe hypovolaemic shock without demonstrable haemorrhage, or clinical staff may fail to recognize the severity of the hypovolaemia, being misled by the amount of the revealed haemorrhage.

Major placental abruption may cause serious renal and coagulation (and other system) problems in addition to haemorrhage. Problems can frequently arise in deciding the priorities for action.

**The “show” (operculum)**
In very late pregnancy sometimes the “show” (the operculum – a plug of blood-streaked mucous) frightens the woman and is mistaken for a haemorrhage. As the cervix becomes soft, either at or immediately prior to the onset of labour, the operculum tears away from the walls of the cervical canal. As it does there is often a small degree of bleeding. This can be alarming, especially for first-time mothers. Usually the bleeding is small and there is only one episode and often the mother goes into labour soon afterwards.

The possibility of incidental and traumatic causes for bleeding should not be forgotten (Figure 8.3).

What can the midwife do if she is the first person called upon?

**The care giver should not undertake a vaginal examination if there is any bleeding from the vagina, as this may cause further bleeding.**

If the bleeding is severe or if there is a known problem or complication (e.g. hypertension) or if the mother is showing signs of shock (rapid pulse, pallor, low blood pressure) an intravenous infusion should be begun immediately before the mother is transported to the nearest appropriate health centre or hospital. It is important to follow your local protocol if one exists.

Ideally all women with bleeding in pregnancy should be accompanied to the referral centre by a person with midwifery skills, as their condition may deteriorate on the way. Delay may be dangerous. In each geographical area local systems (or protocols) should be established and regularly reviewed for transporting pregnant women quickly to the nearest appropriate higher level which can give assistance. Through these protocols all staff should know what to do and whom to contact should such a situation occur. Any bloodstained linen or pads should be sent
with the woman to assist in estimating the amount of blood loss, as actual blood loss is often underestimated

**GROUP WORK**

Fast efficient transportation is essential for many situations, not just when a haemorrhage occurs. Discuss what reliable methods you have in your area for transporting pregnant women to and between hospitals and health clinics. Is there any way to improve the transportation in your area? If there is no local system, work in the group to design one. From whom would you seek help in establishing a system? Share your answers with the other groups.

**Psychological consequences of miscarriage/spontaneous abortion**

In the wanted pregnancy, the psychological consequences of losing the pregnancy can be severe. They are usually underestimated and women may be “comforted” with such words as “Don’t worry, you can have another baby” or “It must have had an abnormality and this is nature’s way of dealing with it”. Neither of these two statements is psychologically reassuring in reality.

Women need understanding and emotional support in the event of a miscarriage. There needs to be recognition of at least the following:

- The woman has lost a baby – no matter how early the pregnancy, provided the woman was aware of it she knows she has lost a child.
- The woman’s body has failed her – it has not performed as a normal woman’s body is expected to do, which is always difficult to accept and more so in the otherwise young and healthy person.
- The woman may believe she has produced an abnormal baby, which is why it has miscarried; in itself this is a frightening thought and fear of its recurrence in a future pregnancy remains with her.
- The woman needs, above all, to be reassured about the cause of the miscarriage; most women tend to blame some action of their own (e.g. smoking, drinking, walking or having intercourse); in most cases these are not a true cause, and any comfort or reassurance you can give the mother to alleviate her need to blame herself is welcome.
- The woman needs information about the chance of another miscarriage in a subsequent pregnancy.

Each woman’s needs and concerns regarding the experience of miscarriage will differ depending on her own culture’s beliefs and customs surrounding miscarriage, her family situation, her obstetric history and her personal psychological make-up. The health worker needs to remain sensitive, supportive and caring to assist a woman and her family (who are also affected, perhaps as deeply as she is) to cope with the loss.

*Note:* If a miscarriage occurs, remember to administer anti-D or equivalent anti-Rhesus immunization, if appropriate.
Figure 8.3 Obstetric management chart: referral management

- **Transport available at health centre**
  - Yes: Inform driver
  - No: Arrange transport

  **Arrange transport**
  Send messenger to arrange transport as soon as possible

- **Select staff**
  Select midwife, nurse or other person to go with patient

- **Prepare emergency equipment needed**
  e.g. delivery pack, fluids, drugs

- **Determine blood group if possible**
  If blood may be needed and blood grouping can be done in health centre, determine blood group of patient and relatives. Select relative most suitable as blood donor

  - Transport is now available

  **Reassess need for referral**
  Reassess patient, is referral still indicated?

  - Yes: Provide final emergency treatment
  - No: Cancel transport

  **Provide final emergency treatment**
  Reassure patient. Check that all necessary emergency treatments (antibiotics, oxytocics, analgesics, fluids) have been given before the journey

  **Write referral letter**
  Write referral letter as shown on page...

  **Management of complications**
  Give clear instruction to staff accompanying patient about emergency management of complications which may arise during journey

  **Load emergency pack**
  Recheck and load emergency pack for management of complications

  **Check position of patient**
  Check the woman is transported in correct position, e.g. if cord is prolapsed, place pillow under her lower pelvis to allow fetus to be displaced towards the diaphragm

  **Send relatives with patient**
  If transfusion may be needed send relatives with patient as possible blood donors

*Source:* adapted from Essex 1981.
Summary and conclusion

Bleeding during pregnancy may not be referred to a health care centre if it occurs at home and far from any medical help. It is extremely important that all women and their families are informed of the serious nature of bleeding in pregnancy and of the importance of not delaying in seeking skilled help. The family should discuss how to arrange transport for the woman to a care giver if bleeding occurs, so that she can be seen quickly by someone skilled enough to help. It is essential that maternity care centres collaborate with community resources, traditional birth attendants and community health promotion centres if women from outlying areas and with less access to health care resources are to receive adequate care during emergencies. These women are at greater risk should an emergency occur and require more attention to prevent maternal mortality.

Protocols are essential for everyone to follow when a complication of pregnancy arises. Protocols for workers in the community or in health centres/posts should state which conditions should be referred to the next level of care, and there must also be protocols for the transport of women from the community to referral centres.

Each area should design its own protocol by using a flow-chart and involving the appropriate personnel. Protocols must be regularly reviewed to ensure they are up to date and take account of the available evidence and medications, and should respond to changes within the community, particularly changes in transportation methods. Refer to the handout showing an example of a referral system for antepartum haemorrhage.
Module 8. Reading

Antepartum haemorrhage

Goal

To distinguish which patients with vaginal bleeding in late pregnancy require immediate interventions and which patients can be evaluated and treated more systematically.

Patient presents with history of vaginal bleeding either in person or via the telephone.

Trigger questions

- Gestation
- Characteristics of the bleeding:
  - colour
  - consistency
  - quantity
- Determine if consistent with show
- Any contributing factors, i.e. intercourse, vaginal examination
- Constant abdominal or back pain
- Rupture of membranes.

If not certain it is a show, the assumption must be made that it is antepartum haemorrhage. The midwife or general practitioner must make an initial assessment either at home or in the hospital.

Need to assess

Does the client have either:

a. a small amount of blood on toilet paper or underwear, or is it post-coitally

   or

b. pools of blood gushing down legs, on floor.

If a: Client comes to unit; we assess fetal and maternal condition. Refer to consultant unit.

If b: Put ambulance on standby. Midwife or general practitioner to attend at home and assess.

If severe APH:

1. 999 ambulance with paramedic
2. initiate IV fluids
3. assess fetal condition
4. warn consultant unit of imminent transfer.

Do not perform a vaginal examination.
MODULE 9.
HYPERTENSIVE DISORDERS

At the end of this module participants should:

- understand, recognize and be familiar with the principles of treatment of essential (pre-existing) hypertension in pregnancy;
- understand, recognize and be familiar with the principles of treatment of pre-eclampsia;
- understand, recognize and be familiar with the principles of treatment of eclampsia.

WHO has stated (1987) that the condition of hypertensive disorders has long been recognized, but there is still no consensus on the definition of the condition or on the classification that should be used. In an attempt to achieve consensus, WHO lists the following as hypertensive disorders of pregnancy (ICD-10):

1. Chronic hypertension and/or renal disease (diagnosed before 20 weeks of gestation or remaining after six weeks after delivery);
2. Chronic hypertension with superimposed proteinuria (superimposed pre-eclampsia);
3. Gestational (transitory) proteinuria (diagnosed after 20 weeks of gestation and disappearing during six weeks after delivery);
4. Gestational (transitory) hypertension (diagnosed after 20 weeks of gestation and disappearing during six weeks after delivery);
5. Pre-eclampsia (gestational hypertension with proteinuria);
6. Eclampsia (generalized convulsions not associated with epilepsy or other known pathology);
7. Unclassified hypertension and/or proteinuria (there are no data on status before 20 weeks of gestation).

Pre-eclampsia and eclampsia

Raised blood pressure in pregnancy always requires investigation. The main condition which it is important to recognize is pre-eclampsia, since the progression to eclampsia is so dangerous if it occurs, although all types of hypertension require careful and skilled management to ensure a successful outcome to the pregnancy.

Eclampsia is a serious condition, seen only in pregnancy, in which the woman has convulsions (or fits) commonly – but by no means always – in the presence of other characteristic preceding physical changes. These convulsions can result in the death of the mother and/or fetus, and the rates of mortality and morbidity of both mother and fetus are high. The convulsions can occur suddenly with little or no warning. Even if mother and/or child do survive, there is a significant risk of permanent disability.

Eclampsia usually follows the condition called pre-eclampsia, although occasionally pregnant women have been reported to have an eclamptic seizure without experiencing or demonstrating signs and symptoms of pre-eclampsia (although sometimes this is because these were not recognized).
Pre-eclampsia

Pre-eclampsia is a complex condition in which the signs and symptoms may be very obvious (e.g. high rises in blood pressure, abdominal pain or significant protein excretion in the urine) or they may be very subtle (e.g. slow decrease in maternal thrombocyte count, deterioration in liver function). Antenatal care is essential for early detection and continuous monitoring of the condition. The only effective treatment is delivery, although controlling blood pressure and using anti-convulsant drugs may help to avoid hypertensive encephalopathy and cerebral haemorrhage.

If the baby is not delivered in time, eclampsia with convulsions and possible irreversible damage and even death for both mother and baby may follow.

Pre-eclampsia only affects women with placental tissue in situ, although not necessarily a fetus since women with hydatidiform mole can develop the condition.

The incidence of pre-eclampsia is 5–7% of all pregnant women. Factors associated with pre-eclampsia are:

- primigravida under 19 years
- low economic status
- history of severe pre-eclampsia
- diabetes
- multiple pregnancy
- chronic hypertension
- hydatidiform mole
- rhesus incompatibility
- obesity
- women over 35
- women of black or Indian backgrounds
- renal disease
- cardiac disease
- stress.

Definition of pre-eclampsia

Although definitions of pre-eclampsia have still not been entirely agreed internationally, the following definitions are widely accepted:

Mild pre-eclampsia:
Mild hypertension plus proteinuria

Severe pre-eclampsia:
1. Severe hypertension plus proteinuria or
2. Any hypertension plus proteinuria plus one of worsening symptoms:
   - hyperreflexia
headache
- blurred vision
- ologuria
- upper abdominal pain
- pulmonary oedema
- platelet count <100 × 10^11, AST > 50 iu/1.

Etiology
The exact cause is still unknown. The fundamental cause is a failure of the placental tissue and the maternal placental bed to interact correctly (it is observed that the vasculature of the placental bed is faulty). From this a whole complex array of system disorders can develop.

There are several theories regarding etiology.

Nutritional deficiency
- There is no evidence that dietary restrictions of any sort (water, salt, etc.) confer any benefit to pregnant women or their offspring. High-protein dietary supplementation should be avoided.
- Deficiency in calcium may cause increased activity in the vascular angiotensin by stimulating prostacyclin synthesis, thus triggering pre-eclampsia. Women who are at high risk of pre-eclampsia and have low dietary calcium intake should receive calcium supplementation during pregnancy.
- Magnesium is known to cause vasodilatation. A deficiency may therefore be associated with pre-eclampsia.
- Free radicals are proposed as a toxic elements that negatively affect maternal vascular function. Altered metabolism of lipids (peroxidation), particularly polyunsaturated fatty acids, interferes with prostacyclin/tromboxan synthesis and leads to an increased sensitivity to angiolensin and platelet aggregation. Low vitamin E, C and β carotene levels may predict development of pre-eclampsia.
- Low plasma zinc levels are associated with pre-eclampsia; zinc competes with cadmium at various biochemical binding sites, exposing the pregnant woman to cadmium toxicity which can cause vasospasms and endothelial cell damage.

Immunological deficiency
Pre-eclampsia is a consequence of maladaptation of local uterine mucosa immunity (basically Natural Killer cells) to invasion of trophoblast resulting in insufficient conversion of uterine spiral arteries into utero-placental arteries.

Genetic predisposition
Pre-eclampsia is related to a single recessive gene in mother and daughters or to a mosaicim in some particular gene or genes group.

Signs
There are many potential signs. These are the commonest found.
**Hypertension**

A rise in diastolic blood pressure of $\geq 110$ mmHg on a single measurement or $\geq 90$ mmHg on two occasions four hours apart. Elevated blood pressure in pre-eclampsia seems to be the result of spasm in the mother’s small arteries. This spasm increases the resistance in these arteries to the flow of blood and so results in elevated blood pressure as the heart tries to force the blood along. Thus, it is essential to record a pregnant woman’s blood pressure on her antenatal card before she is 20 weeks pregnant and to have that card readily available so that later blood pressure readings can be compared with the baseline one.

**Severe hypertension**

A rise in diastolic blood pressure of $\geq 120$ mmHg on a single measurement or $\geq 110$ mmHg on two occasions four hours apart.

**with proteinuria**

The presence of proteinuria – excretion of $\geq 300$ mg/24 h or $\geq 300$ mg/litre or 1+ on a urine dipstick in a clean uncontaminated specimen on at least two occasions (where there is no evidence of urinary tract infection). Pre-eclampsia damages the filtering function of the kidneys so that some of the proteins in the blood escape into the urine. Thus, albuminuria is a warning that the mother’s kidneys are not working normally. As long as her kidneys continue working, albuminuria itself is not a danger to either mother or baby. However, in severe pre-eclampsia kidney function can cease with serious, if not fatal, results.

**and/or oedema**

Oedema of legs (pretibial), face, abdomen or sacrum. During pregnancy the kidneys normally retain more fluid in the body in order to increase blood volume to meet the increased circulatory needs of pregnancy. Normally, a pregnant woman’s capillaries become more permeable and some of the extra fluid seeps into the tissues, resulting in some oedema especially in the third trimester. In pre-eclampsia excessive amounts of fluids leak out of the capillaries into the tissues, resulting in “pitting” oedema of the hands, legs and feet. In severe cases, the entire body may swell up with fluid.

Oedema of the hands and ankles is, however, so frequently a normal physiological response to an increase in circulation and weight gain in pregnancy that this is almost useless as a sign of pre-eclampsia, resulting in much unnecessary overdiagnosis if inappropriately used.

It has been widely taught that a woman should have a raised blood pressure with at least one of the other two signs for pre-eclampsia to be diagnosed. However, this is now recognized as being too simplistic, especially since it is accepted that a woman may have other features of pre-eclampsia before hypertension develops. In addition, the pre-eclamptic state may cause potentially life-threatening disorders of other systems (e.g. lowered thrombocyte count or deterioration in hepatic function) in the presence of no (or very mild degrees of) hypertension. The important principle to grasp is that the pre-eclamptic condition may affect different systems (e.g. blood pressure control mechanisms, renal function, hepatic function, clotting control system, placental function) to very different extents, with potentially different clinical consequences in each and every case. This is why it is so difficult to generalize about this condition.

It is sometimes easy to concentrate on the consequences of pre-eclampsia for the mother and to forget that the condition is a significant cause of restriction of in utero fetal growth, sometimes to
the extent that the fetus dies in utero and is delivered as a stillbirth. It is not surprising that the growth of the fetus is affected, given that (as mentioned above) a basic fault lies in the relationship of the placenta to the maternal placental bed. Care givers must, therefore, ensure that they assess the condition of both the mother and the fetus in all cases of pre-eclampsia.

**Symptoms**

Until the condition becomes serious the woman may not notice any symptoms. This is particularly so if the blood pressure rises slowly, and it is this that underlines the need for regular antenatal care in all maternity systems in the world.

Women may not present to the antenatal clinic/health post complaining of headaches, abdominal pain, oedema or other signs of high blood pressure until the condition is very serious indeed.

**Remember** the importance of teaching all pregnant women and their care givers the symptoms of pre-eclampsia and, at the first sign, of referring the woman for treatment as needed.

**Complications of pre-eclampsia**

*Changes in blood clotting*

Blood clotting depends on the amount of fibrinogen and on the number of platelets (small white blood cells) in the blood. Fibrinogen is the cement that holds a blood clot together and the platelets are the bricks. In pre-eclampsia the number of platelets is reduced so much that the clotting mechanisms are disturbed and the mother is at risk of haemorrhage. Another complication of changes in clotting mechanisms is disseminated intravascular coagulation (DIC), which is the blockage of small arteries with clots resulting in lack of adequate circulation to vital organs such as the heart, lungs, kidneys and brain. Haemolysis may occur when red blood cells are damaged as the heart tries to push them through the clotted arteries.

*Liver damage*

Because liver damage tends to occur late in pre-eclampsia and is recognized by blood tests for liver function and liver enzymes, liver involvement is often misdiagnosed as indigestion due to the frequent epigastric pain associated with indigestion.

*HELLP syndrome*

The HELLP syndrome is rare in pre-eclampsia. It is a combination of haemolysis (H), elevated liver enzymes (EL) and low platelet (LP) count.

*The risk of overdiagnosis and over-treatment of pre-eclampsia*

It may seem strange – in a module where we approach the problem of women who present very late for antenatal care and may therefore present with very advanced signs and symptoms of pre-eclampsia – but we must consider the opposite problems of overdiagnosis and over-treatment. These can themselves result in significant adverse consequences for women and their babies.

In every case of pre-eclampsia there is the potential for disaster. The condition might progress rapidly to a disastrous outcome for mother, baby or both. It is for this reason that maternity services have developed strategies for protecting women and babies who are recognized to be at risk. In many countries these have involved low thresholds for diagnosing significant pre-eclampsia and early recourse to prolonged hospital admission.
However, these approaches have serious drawbacks. Hospital admission is expensive both for the maternity system and for the woman and her family (even in a free health service there are costs that follow from the disruption to family life, as well as the costs of family visiting, etc.). Added to this is the fact that very few of these women do in fact over time progress to a severity of pre-eclampsia which places either them or their babies in danger.

It is this paradox which has caused many maternity services to review critically their management of pre-eclampsia, addressing the definition of significant pre-eclampsia and the need (or otherwise) for intervention.

As a result, it is now felt that mild pre-eclampsia is indeed mild. It is a warning sign of a potential for progression to a more serious level of pre-eclampsia and it is not of itself a reason for taking action as drastic as admitting a woman to hospital. It is a reason for increasing the observations made on a pregnant woman, i.e. for more frequent antenatal checks (possibly twice a week, alternate days or even daily), and if the condition worsens admission to hospital may be necessary. It is now recognized that at this level the condition can be managed in complete safety on an outpatient basis. After all, what is the intention of hospital admission? It is to recognize the woman whose pre-eclampsia develops to a point where delivery of the baby (which will of course stop the process from developing further) is mandatory. We now recognize that this can be achieved perfectly safely in the outpatient setting, and that our previous approach was overprotective; it evolved from the best of intentions but was far too intrusive.

This is a very important issue for many maternity services. A shift to a more liberal and outpatient-focused approach to pre-eclampsia will have far-reaching consequences. Large numbers of antenatal hospital beds will become unnecessary since pre-eclampsia is far and away the major cause of antenatal hospital admissions, and the staff that service them can be redeployed to the community, providing services in or near the mother’s home. Most importantly, women will no longer be imprisoned unnecessarily in hospital. There are advantages to all who are involved in maternity care. In fact, antenatal hospital admission rapidly becomes a relatively rare event once support for pregnant women in the community is built up to an appropriate level.

**Treatment of pre-eclampsia**

1. **Delivery** is the only effective treatment for pre-eclampsia. Delivery usually has advantages for both mother and baby unless the baby is very premature. However, if the complications of pre-eclampsia are threatening the life of the mother there is no choice but delivery, even if immediate delivery means the chances of the baby’s survival are low.

2. **Referral** to a major obstetric unit.

3. Controlling blood pressure although not treating the cause of pre-eclampsia may reduce the severity of complications of late second and third stage pre-eclampsia. Generally blood pressure of 170/110 or above should be controlled keeping diastolic blood pressure in range of 90–100.

   a) **Short antihypertensive drugs**

   Hydralazine dilates arteries thus reducing resistance to blood flow. It has unpleasant side effects in approximately 50% of users, including severe headaches, palpitations, restlessness and anxiety side effects which mimic the symptoms of impending eclampsia. It also must be given by injection, usually in a saline drip. Nifedipine (a calcium channel blocker) reduces blood pressure and can be taken by mouth. Unfortunately headaches are even more common than with hydralazine. Labetolol IV is also an option relevant to nifedipine.
b) Slower acting antihypertensive drugs
Methyldopa suppresses the hypertensive activity of the sympathetic nervous system and controls elevated blood pressure within 6–12 hours. Although it causes extreme sleepiness for the first 48 hours, methyldopa is effective and is the only hypertensive drug known to have little effect on the baby after initial sedation. Beta-blockers such as oxprenolol, labetalol and atenolol interfere with sympathetic nervous system activity and cause fewer side effects than methyldopa. Their short-term safety for babies is established.

Prevention of pre-eclampsia

Weight gain
There is no evidence that weight gain has any effect on the incidence of pre-eclampsia. There is, however, evidence that calcium and some fish (cod and halibut) liver oils have some preventive value. More evidence is needed.

Salt restriction
Previously medical and paramedical personnel were taught that strictly restricting salt (sodium) would prevent pre-eclampsia or help to reduce elevated blood pressure and oedema. Restricting salt intake has proved to be wrong. Recent research has conclusively shown that some salt is essential for normal kidney function: pregnant women who restricted their salt intake had more pre-eclampsia and were more likely to lose their babies than were women who ate a normal amount of salt. Therefore, pregnant women should be permitted to eat a normal amount of salt.

Diuretics
Diuretics were previously given to pregnant women to reduce their fluid retention by forcing the kidneys to excrete more water. Research has shown that the use of diuretics has no impact on the incidence of pre-eclampsia. Diuretics place an additional strain on the mother’s kidneys which are already not functioning properly. The side effects of diuretics have also been recognized as dangerous, so they should not be used to reduce oedema in pregnancy.

Control
The role of anti-hypertensive medication in mild or moderate pre-eclampsia is controversial. The important point to remember is that treatment of the hypertension does not prevent the progression of the condition in other respects (e.g. renal or hepatic dysfunction) and – of crucial importance – it may not in any way interfere with the progression to eclampsia. Anti-hypertensive medication may also interfere with placental blood supply. Therefore this medication must be undertaken with care.

For years it had been assumed that admission to hospital would control blood pressure. It is something of a mystery why such an assumption was made since hospitals are generally very frightening and/or boring places for patients, and there is no reason to suppose that the experience would lower blood pressure. The only role of a hospital is to enable close observation of the medical condition and rapid intervention if necessary. Therefore the only logical reasons for admission to hospital are if there is genuine concern that the woman might progress to eclampsia so rapidly that normal outpatient monitoring would not be safe, or if she lives far from medical help.

Delivering the baby
The condition improves once the baby is delivered, although the improvement may be delayed by a few hours or, more rarely, days. The essential decisions to be made are:

- whether induced delivery is necessary, and if so:
– when and how to deliver (i.e. vaginally or by Caesarean section)
– whether any specific medication is required.

The answers to these questions will depend critically on the facilities available locally. Delivery of premature infants will be hazardous in circumstances where supplies and technological assistance are limited. Local guidance is therefore essential.

**Eclampsia and impending eclampsia**

**Definition of eclampsia**

Eclampsia is a condition peculiar to pregnant or newly delivered women. It is characterized by seizures followed by more or less prolonged coma. The woman usually has hypertension and proteinuria. The seizures may occur in the antepartum, intrapartum or postpartum periods.

The care giver should be alert to the onset of symptoms of eclampsia. Watch for the mother complaining of:

- severe headache
- a sudden rise in or very high blood pressure
- a feeling of nausea or actual vomiting
- epigastric pain (right upper quadrant)
- visual disturbances
- hyperflexia
- jaundice
- decreased urinary output (urine passed in small amounts which are dark in colour)
- sudden or severe oedema, especially of the face or sacrum/lower back.

Actual or, probably, impending eclampsia can be prevented by anti-convulsive therapy. On the other hand, only 1–2% of all pre-eclampsias, if not treated, develop to eclampsia.

**Observations**

Observations where impending eclampsia is suspected should include:

- monitoring of the level of consciousness;
- close monitoring and recording of urinary output, and if the mother has difficulty in using a bedpan a catheter should be in place; oliguria is a poor prognostic sign;
- a central venous pressure line, if available, will help to determine adequate circulating fluid volume;
- diuretics are not normally used;
- close antenatal observation of fetal wellbeing using doptone or a cardiotacograph (if available).
Remember:
The mother should be cared for in a safe environment.
Airway and suction apparatus should always be available.
A woman who has a seizure should not be left alone at all.

Action plan (in primary care centre) if signs and symptoms of severe pre-eclampsia/impending eclampsia occur

- Summon medical aid or send someone to arrange for the woman to be transferred immediately to a referral centre. Quickly and calmly explain to the woman if she is conscious and/or her husband/relatives what is happening.
- Lay the woman on her left side and start to give oxygen via a facemask if one is available.
- Commence slow intravenous running of isotonic fluids and make a careful recording of all fluid intake and output.
- Give an anti-hypertensive drug/agent and/or sedative.

It is important that the woman is transferred to an appropriate safe place for delivery and subsequent care.

Remember: Eclampsia is a life-threatening condition for the mother and fetus.

Treatment and protocol for care in impending eclampsia/eclampsia

From a recent multi-centre study it is recommended that magnesium sulphate is the drug of choice for controlling eclampsia.

Treatment for (impending) eclampsia

The suggested regime is as follows:

1. If a fit occurs, give magnesium sulphate initial single dose 4 g IV over five minutes then (IV regime) 2g IV hourly with infusion or (IM regime) 5 g IM in each buttock, followed by 5 g IM every four hours until 24 hours after birth or after last convulsion (whichever is later). Give IV fluids (if needed) very slowly – 1 litre in 12–24 hours. You MUST check for overdose, i.e. if respiration falls to below 14 per minute, urine output is less than 25 ml/hour or there is absence of knee jerk reflex. If these signs are present, give 1 g calcium gluconate IV slowly or IM into buttocks.

2. If a further seizure occurs, give 2 g magnesium sulphate IV slowly over five minutes, but observe carefully for signs and symptoms of toxicity, i.e. loss of reflexes especially knee jerk and depressed respirations.

Protocol for care

The principles of care include the following.

- If a seizure occurs, ensure that the woman is lying on the ground and there is nothing near her to cause injury. DO NOT try to restrain her. If time allows, try to place a plastic airway or tongue depressor or local equivalent, wrapped in soft cloth, between the woman’s teeth. DO NOT force the mouth open if a seizure has commenced.
- Once the woman enters the coma stage, ensure she is on her left side with head slightly extended to maintain an open airway.
Maintain clear and accurate records of the woman’s condition, including a record of the blood pressure every ten minutes and any drugs given. Ensure the woman receives immediate medical assistance and is transferred to an appropriate medical centre.

Transport the woman to a referral centre immediately once the seizure has stopped. The midwife/trained personnel must accompany the woman to the referral centre and give more drugs if necessary (observe her carefully for signs and symptoms of toxicity, i.e. loss of reflexes, especially knee jerk, and depressed respirations).

**Phases of an eclamptic seizure:**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premonitory</td>
<td>Lasts 10–20 seconds, eyes roll or stare, face and hand muscles may twitch, loss of consciousness</td>
</tr>
<tr>
<td>Tonic</td>
<td>Lasts 10–20 seconds, muscles go stiff and rigid, diaphragm in spasm, breathing stops, mucous membranes, lips and extremities become blue, back may arch, teeth clench and eyes bulge</td>
</tr>
<tr>
<td>Clonic</td>
<td>Lasts 1–2 minutes, violent contractions of muscles, increased saliva may look like foam in mouth, breathing difficult, may inhale saliva, face looks congested, may bite tongue</td>
</tr>
<tr>
<td>Coma</td>
<td>Lasts minutes or hours (depending on the individual), breathing noisy and rapid, face still swollen but not cyanosed; further fits may occur so requires careful nursing and sedation</td>
</tr>
</tbody>
</table>

**Postnatal care following an eclamptic seizure**

Close observation must be maintained for at least the first 48 hours as there is still a risk of another eclamptic seizure.

Anti-convulsivant drug regimes should gradually be reduced. Care givers must observe the condition of the mother for:

- levels of consciousness
- urinary output
- reduction in oedema
- blood pressure recordings
- pyrexia.

The mother should be turned every four hours and her legs gently massaged to prevent complications such as deep venous thrombosis or chest infections.

After 48 hours the mother usually makes a rapid recovery and returns to the normal puerperal state. Memory loss is common and sometimes temporary amnesia due to the convulsion occurs. The care giver should prepare relatives for this so they do not become even more anxious.

The condition of the fetus is largely dependent on the state of the placenta. If the seizure was controlled well and the delivery expedited in a safe environment the outcome may be successful. However, if unfavourable conditions existed prior to the eclampsia developing or occur at an early stage in the second or third trimester, the result may be less favourable.
GROUP WORK
Each of three groups takes a different case and discusses it.

Case 1
Y is a 30-year-old woman having her second baby. Her first son was born two years ago and there were no complications in pregnancy. The boy is fit and healthy. This time she is complaining of being very tired and weak. She is now 30 weeks pregnant. At the clinic she is examined and her blood pressure is found to be 130/90. At the first attendance her blood pressure had been 120/80. She has ankle oedema but no pretibial oedema. Her urinalysis is clear except for a trace of ketones. She looks very tired and unhappy, and complains of many headaches. Her two-year-old child looks well fed and is well dressed.

What is your diagnosis (give reasons for your answer)?
- What test could be done to confirm this?
- What would the midwife do if this woman presented herself to the community health post/centre/feldscher station?

Case 2
J is 22 and having her third baby. She had no problems with any of her other pregnancies. She is now 34 weeks pregnant and the midwife is seeing her in the polyclinic. On examination her blood pressure is 130/90 mmHg; it had been 100/60 mmHg at the start of her pregnancy. She has slight oedema of her hands and her feet, ankles and legs show marked oedema. On testing, her urinalysis shows a moderate amount of proteinuria. She complains of headaches and occasional dizzy spells. She says the baby is not moving very much. The fetal heart is heard and is found to be slightly fast.

- What is your diagnosis (give reasons for your answer)?
- What tests can be done to confirm the diagnosis?
- What action will the midwife take and why?

Case 3
F is 17 years old and pregnant for the first time. She has not attended for antenatal care before and is now approximately 34 weeks pregnant by her dates and by the size of the uterus. Her blood pressure is 130/90, she has a small amount of proteinuria but no oedema. She appears well. Her family have only brought her to the polyclinic because she has not been immunized against tetanus.

- What is your diagnosis (give reasons for your answer)?
- What tests can be done to confirm this diagnosis?
- What action would the midwife who examines her in the community health post/centre/feldscher station take?

Feedback your answers to the main group.

Case History 1
This woman does not have pre-eclampsia as she has only a rise of 10 mmHg from the beginning of her pregnancy (if it had been 20 mmHg it would be different), and she does not have any oedema or proteinuria. She does not have any of the factors which make her at risk of developing pre-eclampsia, so her hypertension is likely to be due to something else. She may be very tired and not getting enough rest, which would explain the presence of ketones in the urine. Her child is still young and she is obviously looking after him well, but as this is her second pregnancy her family is not being very supportive.

A careful history of her daily life activities should be taken and the need for rest and good food discussed. The woman’s blood pressure should be checked the following week, by which time it should have gone down.

Case History 2
This woman has pre-eclampsia and is in need of immediate attention. The rise in blood pressure has been more than 20 mmHg and she has both proteinuria and oedema. She needs immediate referral to specialist care, as it can be too early to induce labour at 34 weeks of pregnancy. There is evidence that this condition has existed for some time as the fetus is beginning to show early signs of fetal...
distress (a slightly fast fetal heartbeat is less of a problem than a slow one but it still indicates there may be problems). She should be referred immediately to the doctor at the district hospital, depending on the availability of a specialist obstetrician.

Diagnosis is made on the clinical signs providing the blood pressure, and urinalysis has been carried out according to the correct procedures.

Arrangements should be made for her to be transferred immediately and she should be given a sedative or hypotensive drug depending on medical orders.

**Case History 3**

This woman may well have pre-eclampsia but it is more likely to be something else that is causing her signs and symptoms, possibly low-grade urinary tract infection. The physiological changes in the urinary system put the woman at risk of developing such infections. Although she has no history of fever she may have a low-grade infection that does not give rise to fever. As she has not attended the antenatal clinic before 34 weeks we are not sure if the blood pressure of 130/90 is normal or is a significant rise.

A mid-stream specimen of urine (MSSU) should be taken to see if bacteria are present and a careful history of the woman noted. She should be referred to a doctor, who will prescribe antibiotics once the MSSU has been obtained. She should have a follow-up appointment the following week (if possible) to monitor her blood pressure and see if it is rising.

**Protocol for the management of severe pre-eclampsia/eclampsia**

Criteria for inclusion:

(a) Hypertension (140/90 mmHg) with proteinuria 300 mg/l or 1+ and at least one of the following:

(i) headache, visual disturbance, epigastric pain

(ii) clonus (3 beats)

(iii) platelet count <100 × 10^3/l, AST >50 iu/l.

(b) Severe hypertension (systolic 170 mmHg or diastolic 110 mmHg) with proteinuria (300 mg/l or 1+).

(c) Eclampsia.

The consultant on call should be informed of any woman who fulfils these criteria by the duty registrar. The method and timing of delivery will then be decided. The anaesthetist should also be informed and the neonatologist should be consulted if the pregnancy is preterm.

**Flow chart for management of severe pre-eclampsia/eclampsia**

One to one midwifery care

Insert urinary catheter and intravenous line

Send blood urgently for platelets, blood-clotting factors, liver function tests, blood type

Fluid balance, antihypertensive and anticonvulsant treatment

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Continuous fetal monitoring until delivery

Delivery: take cord blood for pH

Remain in labour and delivery unit for continuous monitoring of clinical condition for at least 24 hours after delivery. The decision to discharge a woman to the postnatal ward must be made by the physician. Repeat blood-clotting studies every 12 hours and liver function tests daily until stable.
Blood-pressure measurement and classification in pregnancy

John R Higgins, Michael de Swiet

Pre-eclampsia is usually defined on the basis of new onset hypertension and albuminuria developing after 20 weeks of pregnancy. There are difficulties with measurement of these variables. Conventional sphygmomanometry remains the gold standard for blood-pressure measurement. The value of ambulatory blood-pressure measurement has yet to be established. Oedema is now omitted from all definitions of pre-eclampsia, although the finding of widespread severe oedema of sudden onset should not be ignored for clinical purposes. Definitions of pre-eclampsia based solely on hypertension or proteinuria do not include wide clinical variability in this syndrome. Women with no proteinuria but who do have hypertension and other features such as severe headache or other symptoms, thrombocytopenia, hyperuricaemia, disordered liver function, and fetal compromise are likely to have pre-eclampsia. This notion is accepted in the more than hinted at in the new American College of Obstetricians and Gynecologists’ definition. Definitions used for clinical purposes should be as safe as practical; they are likely to include a considerable number of false positives. Most research studies are weakened if patients without the disease are included. Therefore, a separate stringent research definition of pre-eclampsia we also suggest.

Almost 100 years ago, J C Briggs and H W Cook, two housemen at Johns Hopkins Hospital, described use of the Riva-Rocci sphygmomanometer to measure blood pressure in pregnancy. Blood-pressure measurement is still the most commonly used screening test in antenatal care. However, pre-eclampsia is much more than pregnancy-induced hypertension. The clinical presentation is extremely variable, reflecting the complexity of the underlying pathology. Thus, classification of pre-eclampsia has proved very difficult. In this review, we highlight the limitations of conventional blood-pressure measurement, assess the role of ambulatory blood-pressure monitoring (ABPM) in pregnancy, and suggest a practical approach to the classification of pre-eclampsia.

Conventional blood-pressure measurement in pregnancy

Despite widespread use, conventional blood-pressure readings are prone to inaccuracy due not only to observer and device error, but also to the inherent variability of blood pressure and to the pressor effects of attendance at the clinic (white-coat hypertension). Several authorities have made recommendations to minimize errors with regard to conventional blood-pressure measurement. A reasonable composite protocol is that blood pressure should be measured when the woman is seated, with her feet supported or on the ground, and her arm at the level of the heart. The right arm should be used with a cuff of appropriate size. Measurements should be made with a mercury sphygmomanometer and should be recorded to the nearest 2 mm Hg. In centres where the use of mercury has been banned for clinical purposes, the sphygmomanometer will have to be replaced by an electronic device that has been validated for pregnancy. Evidence suggests that many practitioners, involved in antenatal care, fail to take even the most basic precautions to lessen error. Brown and colleagues noted that 78% of obstetricians and midwives had never had their sphygmomanometer calibrated or were unaware whether it had ever been done, and only 45% of obstetricians used a large cuff when required. Perry and colleagues reported that two-thirds of practitioners measured blood to the nearest 5 mm Hg and a quarter to the nearest 10 mm Hg. A further area of controversy, particular to pregnancy, relates to the measurement of diastolic blood-pressure with Korotkoff phase IV (muffling) or phase V (sound disappearance). Until recently, most classifications recommended use of phase IV. Proponents of phase IV argued that, because of the unique haemodynamics of pregnancy, it more closely approximates intra-arterial blood pressure and that phase V is often very low or near zero. Also, phase IV is more difficult to detect than phase V, being absent in between 17% and 57% of pregnant women. Even when heard, phase IV has limited reproducibility. Concerns about the safety of a change from phase IV to phase V were addressed in a prospective randomised trial of 220 pregnant women with diastolic hypertension in the second half of pregnancy. The investigators reported that a change in practice would mean that one case less of severe diastolic hypertension would be recorded for every six hypertensive pregnancies but all other episodes of severe hypertension would be recorded with similar validity. No clinically significant differences in outcome were noted when phase V was used rather than phase IV.

Ambulatory blood-pressure monitoring

Ambulatory blood-pressure monitoring (ABPM) overcomes many of the limitations of conventional blood-pressure measurement and has become established for personal use only. Not to be reproduced without permission of The Lancet.
PRE- ECLAMPSIA TRIO

part of the clinical management of non-pregnancy hypertension. It provides objective, repeated measurements in a non-clinical environment. Because of concern that the haemodynamic changes of normal pregnancy might affect the ability of automated devices to measure blood pressure accurately, the application of ABPM has been accompanied by stringent validation of the monitoring devices. Several ABPM devices have been successfully validated specifically for use in pregnancy and used to generate normal ranges for ABPM throughout gestation. The hope has been that ABPM will substantially enhance assessment of blood pressure in pregnancy. Clinical application of ABPM has been assessed in three main areas: white-coat hypertension; early prediction of pre-eclampsia; and prognostic assessment of hypertension in later pregnancy.

White-coat hypertension

White-coat hypertension can broadly be defined as persistently raised clinic blood pressure with normal blood pressure at other times. In the non-pregnant population, white-coat hypertension arises in up to 21% of patients with borderline hypertension. The long-term risks of white-coat hypertension are the same as those of true hypertension and normotension. Several studies have shown that white-coat hypertension is more common if the patient is male and young suggesting that it may be important in pregnancy. Bellomo and colleagues reported a frequency of white-coat hypertension (high office blood-pressure with normal average 24 h ambulatory blood-pressure) of 29% in 146 patients with hypertension recruited in the third trimester. Compared with women with white-coat hypertension, women with true hypertension were more likely to have pre-eclampsia or gestational hypertension, had significantly lower birthweights, longer hospital stay, and earlier gestation at delivery. Except for an increased caesarean-section rate, women with white-coat hypertension had similar outcomes to a normotensive control group. High office blood-pressure was defined, in this study, on the basis of two sets of three blood pressure readings or obstetrical day-case unit assessment. Ambulatory blood-pressure readings correlate better with 24 h urinary protein excretion. Peep and colleagues studied 109 multiparous women with hypertension in late pregnancy and showed that ABPM diastolic blood-pressure readings were more informative than diastolic blood-pressure measured in the day-care unit. The relative risks of a diastolic ambulatory blood-pressure of more than 90 mm Hg for: proteinuria were 1.42 (95% CI 1.06–1.92); protein delivery 5.75 (1.78–14.89); birthweight below the 10th centile 2.9 (1.49–5.76); admission to special care nursery 5.93 (1.71–19.13); and caesarean section 2.96 (1.24–7.04). In a much larger study of over 300 women, ABPM was again shown to be a better predictor of subsequent severe hypertension than day-care unit assessment, but in this study it was not a more useful predictor for other outcomes.

Can these results be translated into clinical benefits for pregnant women with hypertension? There are several reasons why this next step may be more difficult. First, according to the current literature no significant difference was found between patients with pre-eclampsia and normotensive controls in the frequency of white-coat hypertension on the basis of average height and weight. Second, although blood pressure is an important clinical feature management of women with pre-eclampsia depends not only on blood pressure but also on maternal symptomology, changes in renal and hepatic biochemistry, alterations in coagulation, and assessment of fetal wellbeing. Third, and perhaps most importantly, there have been concerns about the accuracy of some ABPM devices in women who are hypertensive during pregnancy. This inaccuracy is most striking in women with established pre-eclampsia and can lead to a large underestimation of the true blood pressure. These findings have important implications not just for the application of ABPM but also for the use of

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automated blood-pressure devices in women who are
affect by severe pre-eclampsia.

At present, careful blood-pressure measurement with
a mercury sphygmomanometer remains the gold standard.
All automated blood-pressure devices need to be
specifically validated for use in pregnancy and preferably
in patients with pre-eclampsia. Randomised trials of
ABPM compared with conventional blood-pressure
measurement in hypertensive pregnant women are now
urgently needed.

Defining and classifying pre-eclampsia

Oedema

Oedema is such a common feature of normal pregnancy
that it is no longer part of most current definitions of
pre-eclampsia. From a practical point of view, mild oedema
can be ignored but sudden severe widespread oedema
cannot—it is likely to be pathological and further
investigation is necessary. Of course, the pathology is not
necessarily pre-eclampsia; it could lie primarily in the
kidney (eg, in nephrotic syndrome) or elsewhere in the
circulation due to congestive cardiac failure.

Hypertension

Most would consider hypertension to be the hallmark
of pre-eclampsia. Use of hypertension as a defining feature
of pre-eclampsia cannot be avoided but there are
difficulties with blood-pressure measurement, characterisation of a patient’s blood pressure, and
distinguishing a pathological from a physiological
response. Also, the very notion of hypertension is an
artificial one, in that whatever threshold chosen is an
artifact imposed on a continuous distribution.

Can patients be characterised by their blood pressure
and in particular can they be characterised by a single
blood-pressure reading? All definitions of pre-eclampsia
assume that this is the case and define pre-eclampsia on
the basis of a single blood-pressure reading, if high
enough. Two readings, 4 to 6 h apart allow the definition
to be met at lower blood pressures. Single readings might
be very unrepresentative of the patient’s normal blood
pressure status. Perhaps the most difficult aspect of using
blood pressure to define pre-eclampsia is in separating
physiology from pathology. Serial studies measuring
blood pressure longitudinally throughout pregnancy have
shown that both diastolic and systolic blood-pressure fall
in the second trimester to return to non-pregnancy values
by the end of the third trimester.† Thus a definition of
normal blood pressure should be related to gestation, an
idea that has not found much favour, even though
gestation-dependent changes in blood pressure have been
known about for a long time. Perhaps it is believed that
these gestation-based blood-pressure changes are small
by comparison with random variation and with
measurement error.

Some individuals could respond differently and have
higher blood pressure than non-pregnant women at the
end of the third trimester, without pre-eclampsia; this is
known as gestational hypertension, a condition which in
the absence of other features of pre-eclampsia is
associated with fetal growth restriction rather than fetal
growth restriction. Nevertheless women who are going to
develop the full syndrome of pre-eclampsia usually become
hypertensive before they develop proteinuria, and therefore new onset hypertension without other features of pre-eclampsia (pregnancy-induced hypertension) is often thought of as a prodromal phase before development of the complete
syndrome. Clinicians must remember, however, that
hypertension could be due to pathological processes
other than pre-eclampsia. For example, pheochromocytoma
can mimic all features of pre-eclampsia.

Proteinuria

If hypertension is the hallmark of pre-eclampsia, then
most would believe that it is proteinuria which distinguishes
the hypertension of other causes (maternal or
innocent) from the hypertension of pre-eclampsia. But,
because of the variability of pre-eclampsia it is possible to
have severe disease with all the other features of
pre-eclampsia but without proteinuria.

For clinical purposes, proteinuria is usually screened for
by using a dipstick technique, which indirectly tests for
the presence of protein; + albuminuria being taken as positive.
List is the amount of protein secreted in the urine over a
24 h period that is the gold standard. The concentration of
protein in the urine varies a lot throughout the day partly
in relation to urine flow, which can be allowed for
by measuring the urine protein/creatinine ratio, rather
than the protein concentration itself.

There are potentially as many errors estimating
proteinuria by the use of dipsticks as there are in
blood-pressure measurement. Formal methodological
studies have shown that pupil midwives, trained midwives,
and trained laboratory staff differ in their assessment of
albuminuria using dipsticks, the worst performers being
pupil midwives. Also dipsticks themselves do not
accurately predict the presence of significant quantities
of proteinuria. There are high false positive and false
negative rates with a + reading if a protein concentration of
300 mg/L is judged significant. There would be fewer
false positives and not many more false negatives if ++
proteinuria was used as an index of significant
proteinuria. Nevertheless in the interests of patient safety
it is likely that ++ proteinuria, a spot concentration of
500 mg/L or total excretion of 300 mg per 24 h will continue
to be the definitions of substantial proteinuria with regard
of pre-eclampsia.

Current classifications of pregnancy
hypertension

Three definitions are commonly cited. In general
these definitions are advocated for epidemiological
purposes—ie, to describe the incidence and prevalence of
hypertension in pregnancy in populations rather than to
guide clinical management or to stringently characterise
patients with pre-eclampsia for research purposes
(penal).

Dawdy and MacGillivray's definition† of pregnancy
hypertension, is described and also contains several
differing forms of hypertension that could arise in
pregnancy. With regard to gestational proteinuric
hypertension and pre-eclampsia, the definition stipulates
normotension before 20 weeks gestation, and
hypertension and proteinuria developing after 20 weeks.
Hypertension is diagnosed by a single diastolic blood-
pressure of 110 mm Hg or greater (phase IV) or
consecutive readings of 90 mm Hg or greater on more
than one occasion at least 4 h apart. Proteinuria is defined
as a 24 h excretion of 300 mg or more, two clean-catch
urine specimens at least 4 h apart with: ++ proteinuria by
dipstick; + proteinuria if specific gravity less than 1010;
and proteinuria index of 1000 or more.

Redman and Jeffers's sought blood-pressure
characteristics that would maximise the chance of
PRE-ECLAMPSIA

The American College of Obstetricians and Gynecologists' definition was based on the National Institutes of Health working group in 1990, and was recently updated: defined hypertension as diastolic hypertension in pregnancy; pre-eclampsia-eclampsia; pre-eclampsia superimposed on chronic hypertension; and gestational hypertension.

**Definition**
- **Pre-eclampsia:**
  - Hypertension—blood pressure ≥140/90 mm Hg occurring after 20 weeks of gestation.
  - Pre-eclampsia superimposed on chronic hypertension is regarded as highly likely in women with pre-existing hypertension and proteinuria who have sudden increases in blood pressure or proteinuria, thrombocytopenia, or increases in hepatocellular enzymes.

**Pre-eclampsia**

- **Diagnosis:**
  - Hypertension—blood pressure ≥140/90 mm Hg occurring after 20 weeks of gestation.
  - Proteinuria—greater than 300 mg/L protein in a random specimen or an estimation of 300 mg per 24 h.

**Proteinuria**

- **Importance:**
  - Proteinuria is typically associated with pre-eclampsia.

**Features of the condition**

Identifying women with other features of pre-eclampsia such as a high proportion of primigravida and the development of proteinuria. The definition was therefore based on a diastolic blood pressure below 90 mm Hg before 20 weeks and a subsequent rise of at least 25 mm Hg to a maximum reading of at least 90 mm Hg. In many ways, this is the most practical definition because it allows a diagnosis to be made in the absence of proteinuria and does not rely on oedema; limitations are the need to know the blood pressure in the first half of pregnancy and the inability to diagnose pre-eclampsia superimposed on pre-existing hypertension.

**A way forward**

The variable nature of pre-eclampsia mirrors the complexity of the pathophysiology of the condition. It is possible that pre-eclampsia is not a single entity, but only a final common pathway by which the women react to pathological pregnancy. Any definition will to some extent be arbitrary, and may be supported by consensus, but not by a precise relation to pathogenesis. It is therefore not surprising that an agreed classification has proved so elusive. In these circumstances, why do we seek to define pre-eclampsia? Clinicians seek to define pre-eclampsia to identify a group of women who have pregnancies at higher than average risk either to the women themselves or to their fetuses. By contrast, researchers seek to define pre-eclampsia so that workers can be as certain as possible that they are studying pre-eclampsia and not some other disease. Unlike the clinical definition, it does not matter if some who have the disease are omitted. What matters is that those who do not have the disease are excluded.

**Clinical definition**

Given the current high expectations for the outcome of pregnancy, the definition should be as all encompassing as practical, even if it has a high false-positive rate—i.e., women will be included where the excess risk is small, if there is any at all. For such a group a practical definition for pregnancy-induced hypertension would be: new hypertension with blood pressure of 140 mm Hg systolic or greater or 90 mm Hg diastolic or greater (phase V) arising after 20 weeks. This group does not necessarily have pre-eclampsia but is at risk of developing pre-eclampsia and must receive closer monitoring. The development of pre-eclampsia will usually depend on the appearance of new proteinuria (≥ albuminuria on at least two occasions not in hospital, urine protein concentration 500 mg/L, urine protein excretion 300 mg per 24 h) but other features such as fetal compromise symptoms, edema, hyperemesis, thrombocytopenia, or other manifestations of HELLP (hemolysis, elevated liver enzymes, and low platelet count) syndrome could also be used to define the appearance of pre-eclampsia. A very similar approach has recently been advocated by the Australasian Society for the Study of Hypertension in Pregnancy. In essence it is not necessary to define the change from pregnancy-induced hypertension to pre-eclampsia for clinical management since the patients have already been selected as high risk. That is because their management will depend on the appearance of other features of pre-eclampsia, not an arbitrary definition of the condition. For the same reason it is not necessary for clinical purposes to define pre-eclampsia superimposed on pre-existing hypertension. For clinical purposes, all women who present before 20 weeks' gestation with hypertension (≥140/90 mm Hg) or who have lower blood pressures taking antihypertensive drugs are at increased risk and need to be monitored for the development of other features of pre-eclampsia.

**Research definition**

Since women with recurrent pre-eclampsia often have other underlying conditions such as renal disease or hypertension, the disease should be defined only in primigravida. Blood pressure should be measured before 20 weeks' gestation, less than 140/90 mm Hg (Korotkoff phase IV), and rise after 20 weeks' gestation to 90 mm Hg diastolic or more on two occasions at least 4 h apart, to 100 mm Hg diastolic or greater on one occasion. There should be proteinuria greater than 300 mg per 24 h developing de novo after 20 weeks' gestation. By 3 months after delivery, blood pressure should be recorded as normal, less than 140/90 mm Hg, and there should be no proteinuria. The above suggestions do not preclude study of patients who are multigravida or who have other diseases. But such patients should be analyzed separately from those who have the more narrowly defined form of the condition.

In conclusion, granted the lack of precision in definition of pre-eclampsia, any definition that is used clinically should be as loose as practical for patient safety, whereas research definitions should be stringent.

**References**

Module 9. Reading

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MODULE 10.
LABOUR

At the end of this module participants should:

- be able to recognize the importance of assessing all women who begin labour in an apparently low risk state, but in a manner which still regards low risk as the expected state rather than assuming that there will be reasons to re-label women as high risk;
- be clear about the design of professional care for low risk labour and the need for attention to the details of making the process more user-friendly;
- question any activity performed in low risk labour without clear justification;
- be able to manage the first stage of labour;
- be able to encourage women to use different positions during the first stage of labour;
- be able to use a variety of methods (including non-pharmacological means) of managing pain in labour;
- know what observations to make to observe progress in labour;
- know how to manage a woman’s diet during labour;
- be alert to the importance of making labour less “medical”;
- recognize the importance of providing support for women in labour and birth;
- recognize that the place of delivery is not as important as the conditions available at that place for a clean and safe delivery.

Readings:
WHO appropriate technology for birth revisited
Artificial rupture of membranes
Companionship to modify the clinical birth environment: effects on progress and perceptions of labour and breastfeeding
WHO recommendations on appropriate technology for birth
Guidelines for care in labour
Social support in labour
Food for thought
Maternity Care in Canada, United States and St Petersburg (1993–1997 figures)

There is tension among professionals in many (if not most) countries of the world regarding the medical as contrasted with the social and physiological models of labour. There are possibly elements of both approaches in all labours. However, there is clear evidence that there is no value in involving doctors in the care of all women in labour. Trained midwives are probably the ideal birth attendants for most labours. This approach is supported by women who express their wish for a less medical approach to birth than is currently offered in many places.

In health care systems with a heavy emphasis on doctors there is nearly always a failure to recognize that labour can be low risk. Where possible, no intervention is performed on the
women in labour unless it is both indicated and demonstrated to be likely to be effective – particularly (but not exclusively) in the low risk labour.

**Interventions in labour**

**Effective interventions**

There are, however, some practices which can be regarded as beneficial interventions in labour. Most important of these is the continuous presence of a supportive companion, ideally chosen by the mother during labour. This has been shown to:

- reduce the length of labour
- reduce the need for pain relief
- reduce operative delivery
- reduce poor neonatal outcome (poor Apgar score at five minutes)
- reduce negative ratings of labour experiences
- be probably more effective than the physical environment of the delivery area.

Companions should be of the woman’s choosing without pressure from care givers. They should also be prepared for their role in labour and delivery, just as the woman should be prepared for her experience during birth (see handout on *Companionship in labour*).

Allowing women their choice of position in second stage labour also reduces:

- discomfort
- abnormal delivery
- perineal/vaginal trauma
- wound infections.

Additional interventions that have been shown to be beneficial include:

- respecting the parents’ informed choice regarding the place of birth
- respecting the mother’s right to privacy at the place of birth
- encouraging the use of a birth plan composed by the mother
- giving women as much information as they want
- monitoring the mother’s physical and emotional wellbeing during labour
- offering mothers appropriate oral fluids throughout labour and delivery
- using routine oxytocics in the third stage if a risk is perceived or haemorrhage has occurred
- encouraging women to remain mobile during labour.

Active management of the third stage of labour with prophylactic oxytocic drugs and controlled cord traction:

- reduces postpartum blood loss
- reduces the length of stage 3
reduces the need for therapeutic oxytocics

**BUT** increases the risk of hypertension and vomiting.

**Ineffective interventions**

Ineffective interventions in low risk labour include:

- routine shaving of the perineum and pubic areas of labouring women;
- routine use of antacids, metoclopramine, glycopyrrolate, sodium citrate or cimetidine during labour (cannot be relied on to prevent acid aspiration syndrome);
- routine use of enemas on admission in labour;
- denying the women choice of position;
- routine use of the supine position in first stage labour;
- routine use of the lithotomy position (with or without the stirrups) for delivery;
- routine use of episiotomy.

**Interventions of unknown effectiveness**

Interventions of unknown effectiveness in low risk labours include:

- vaginal cleansing with chlorhexidrine during labour
- routine early amniotomy in labour, and
- extraordinary as it may seem – practically everything else we do in labour.

The screening of women admitted in labour for signs of deviation from the normal is an important area. Once again there is a danger that this screening – which has to be routine – can be used very crudely in order to create excuses for intruding with medical interventions into otherwise normal labours. Participants should be aware that it is essential to justify any attempts to label normal labours as abnormal. Normal/low risk should be the expected state.

**EXERCISE**

Discuss your attitudes towards giving mothers and their families more say in the design of low risk care.

In small groups, discuss what interventions are really essential in caring for a woman in labour. Consider newer and more liberal approaches to care in labour. Do not forget to discuss issues such as the clothes worn by professionals, the antiseptic precautions and whether they are either useful or necessary, whether companions in labour can be accommodated in the maternity system — and if not, why not. Discuss how to make the services more user-friendly.

Many of these issues are discussed in more detail below.

**Management of labour**

The onset of labour is usually at 39 to 41 weeks, but it can occur at any stage of pregnancy.

Once labour has begun the person ultimately responsible for caring for the woman must stay with her. This commitment to a woman should begin at admission and should continue until all three stages of labour are complete. Continuity of care and care giver is the best for the mother.
Women should be aware of the type of care available to them. They should be given information about the advantages and disadvantages of specific procedures and encouraged to consider the various options available to them during labour and delivery so as to make an informed choice when this is possible and safe for both them and the baby. They should also have the right to refuse treatment. They should be allowed to control their labour as far as is possible and safe and to be active partners in this process.

The first stage of labour

The first stage of labour is from the onset of regular uterine contractions accompanied by effacement of the os and dilatation of the cervical os to full dilatation of the cervix.

Although the exact mechanism is unknown, the onset of labour is recognized as having multiple inputs, including hormonal and mechanical factors. There is also fetal influence, but the detail is not known.

The length of labour varies widely. The factors influencing it include parity, birth interval, psychological state, presentation and position, pelvic shape and size and the character of uterine contractions. Two stages of the first period of labour have been identified as the latent and the active stages.

The first stage of labour sometimes starts with a “show”, a pink blood-stained mucous vaginal discharge lost from the cervix as it begins to dilate. Regular contractions may start before the show, at the same time as it appears or afterwards. With each contraction the uterus hardens and the mother feels pain in the abdomen and sometimes in the lower back. As labour progresses the contractions increase in strength, frequency and duration. Later in the first stage of labour the mother will experience strong contractions every two minutes, each lasting up to sixty seconds.

The membranes may or may not rupture spontaneously, with a sudden uncontrollable loss of watery fluid from the vagina. The membranes may be ruptured artificially (amniotomy) during the first stage of labour; this may quicken the labour but the contractions become stronger and more painful. The routine practice of performing an amniotomy cannot be justified on the basis of well conducted randomized control trials. Each woman’s needs and wishes should be assessed individually and the care giver is responsible for ensuring that the mother is provided with the necessary information with which to make an informed choice. Dilatation of the cervix constitutes the only proof of labour.

The physiological changes that take place during the first stage are:

- uterine activity resulting in:
  - contraction and retraction of the uterine muscle
  - effacement of the cervix and dilatation of the os uteri
  - fundal dominance
  - polarity of the uterus
  - an active upper uterine segment and a passive lower uterine segment
  - formation of the retraction ring.

- mechanical factors:
  - formation of the forewaters
Essential Antenatal, Perinatal and Postpartum Care

- general fluid pressure
- rupture of the membranes
- fetal axis pressure.

**Positions for the first stage of labour**

A safe delivery is one where the birth attendant monitors progress to avoid prolonged labour and to detect obstructions. Prolonged and/or obstructed labour can lead to haemorrhage, infection and shock in the mother and birth asphyxia and brain damage in the baby.

The woman should be free to move around freely, choosing comfortable positions – standing, walking, sitting, kneeling or squatting (Figure 10.1). Being active during labour is instinctive. It is also more comfortable, safer and more efficient, and it allows the mother to cope with her pain better.

![Figure 10.1 Positions for the first stage of labour](image-url)

- Sitting normally on chair
- Leaning on to partner
- Sitting against bean bag
- Sitting in partner's lap
- Sitting on low stool
- On all fours
- Kneeling onto pile of cushions
The mother may also like to lie in a warm bath, if available. This will relieve the discomfort as well as helping her relax. Water as a means of relaxation during labour is growing in popularity. If the mother prefers to lie on her back during the first stage of labour remember to turn her on her left side to prevent supine hypotension syndrome. This is when the heavy uterus reduces the venous blood return from the lower part of the body, reducing the input to the heart by compressing the inferior vena cava. As a result the output from the heart is also reduced, leading to falls in the pulse rate and blood pressure. This will have a detrimental effect on the blood supply to the uterus and placenta and reduce the amount of oxygen to the fetus.

**EXERCISE**

Figure 10.1 shows some of the more common positions used by women in the first period of labour. Participants should try these positions themselves, taking it in turns to be the mother and the midwife.

**Pain management in labour**

The degree of pain perceived by a woman in childbirth depends on her emotional state and cultural expectations. Her pain is less when she feels relaxed, unafraid and reassured by the continuous, comforting support of her birth attendant.

In cultures accustomed to obstetric intervention in labour, the use of drugs to relieve discomfort is high. The most commonly used narcotic drug is pethidine. This, however, has many disadvantages as it not only reduces the mother’s awareness of pain but may also slow down the birthing process. It also crosses the placenta and may depress the baby’s breathing and suckling. This is a particular problem if the delivery occurs within an hour of pethidine being administered intramuscularly. Babies born to mothers given pethidine may also be sleepy for some days after birth, and this may in turn interfere with successful breastfeeding.

Other forms of pharmacological relief of pain are also commonly used in different parts of the world. One of the most prevalent in some areas is epidural or spinal anaesthetic. There is much debate about how beneficial this technique really is as although it is frequently successful in reducing or eliminating the pain of contractions it can also have side effects which are undesirable, and the technique is not without risk. Maternal mobility in labour may be reduced by an epidural or similar anaesthetic, and because the woman is unable to feel contractions and to bear down effectively in response to them, forceps and vacuum extractions are more frequently necessary. The woman may also experience backache and headaches as a follow-up to the epidural, which can severely hinder her ability to (and interest in) care for her baby in the days after giving birth.

Alternative methods of pain relief, particularly non-pharmacological ones, are preferable first-line approaches to pain management in labour. These include encouraging the woman to be ambulant in labour, to adopt different positions which bring relief even if only for a while, and to remain upright for as long as possible. Relaxation techniques, visual imagery which “takes the mother away” for a few moments, distraction and massage may all assist at times during labour and are preferable to pharmacological relief. Of great importance is emotional support and encouragement as well as praise for the woman for how well she is coping with the considerable pain of labour. Under no circumstances should women be chastised for expressing pain in labour or told to pull themselves together or to think of what they are doing to their baby by expressing pain. Expressing pain may be a psychologically healthy way of coping with it and should not be regarded with disfavour or discouraged.
At the same time, care should be taken by all care givers to minimize the pain experienced by the woman by making sure that any necessary examinations are sensitive and gentle and by treating her with respect and consideration at all times.

Observations to assess progress in labour

[Participants may find it helpful to read Module 11 on the partogram and the example of a protocol for care in labour prior to this session.]

All vital signs (maternal and fetal) should be recorded at regular intervals, i.e. temperature, pulse, blood pressure, urinalysis and fetal heart rate, to determine the general condition. The strength and frequency of contractions should also be recorded at regular intervals. The sheets used for recording this information should be designed to enable the condition of the mother and fetus to be seen at a glance. A partogram is an example of a recording sheet of this nature. It is a pictorial representation of the progress of labour and is an extremely valuable tool to assist the midwife to detect early onset of problems in labour. It is designed to alert the care giver to problems at the earliest possible moment.

The progress of the first stage of labour is measured by the dilatation of the os uteri. As the os uteri dilates the baby’s head gradually descends further into the pelvic cavity, rotating slowly as it descends so that the widest diameter of the baby’s head is in the widest diameter of the pelvis. The dilatation of the os uteri occurs as a result of the uterine contractions which pull up on the cervix at the same time as the baby’s head exerts pressure on the cervix which assists and promotes dilatation. Full dilatation is – by convention – when the os uteri is dilated by 10 cm. A vaginal examination has to be performed to assess the dilatation of the cervix; remember that care must be taken to prevent infection at this time. The major risk is that the person performing the examination might introduce infection, either from him/herself to the woman, by cross-infection from other patients, or possibly from the mother’s perineal area. Hands must therefore be washed thoroughly, an aseptic technique must be used and plastic or rubber gloves must be worn if available. In general, vaginal examinations should not be done during a contraction unless it is necessary to diagnose changes occurring in the cervix during a contraction itself. Unless this is medically indicated, however, it should be avoided as it is far more painful for the woman.

Diet during labour

For many years diet has been restricted in labour in case the mother requires an emergency anaesthetic, as protection against maternal deaths secondary to aspiration of gastric contents during general anaesthesia. Many units are now relaxing this strict regime and allowing the mother to choose if she would like to eat or drink, on the principle that the stomach contents are likely to be less acidic (higher pH) if the mother has had a light diet. Maternal ketoacidosis (secondary to this starvation) is also reduced, with possible benefits to the fetus. Again the mother will feel more comfortable and relaxed if she remains in control of whether she eats or not. For more information on eating in labour read the handout on Food for thought – should women fast or feed in labour?

Changed attitudes and practices regarding birth

In general, the past decade has brought with it a changed attitude towards professional care during labour. Stimulated by the findings of randomized control trials (Chalmers I., et al., 1989), which demonstrated the harmfulness of many interventions traditionally practised in labour (such as routine shaving, enemas, episiotomy, artificial rupture of membranes, and induction without true
indication), together with the WHO Recommendations for birth (1986), attitudes and practices surrounding birth have become far more considerate of women’s feelings and conservative in practice in recent years. No longer are routine interventions in birth regarded as beneficial. Instead interventions should only be applied when medically indicated, and indications for these interventions are far less frequent than professionals believed in the past. For example, it can be argued that Caesarean sections should not occur in more than 5–15% of deliveries (depending on the level of referral hospital), episiotomies should be a rare events (perhaps occurring in less than 10% of births) shaving of either the pubic or the perineal area is never required on medical grounds and may result in more rather than fewer infections, and enemas are not beneficial and often contribute to a woman soiling herself during delivery rather than preventing it. Routine sweeping or massage of the perineum in any way has not been shown to be beneficial either. Routine amniotomy is also not justified by research. These can be replaced instead by a “hands-off” approach of watching and waiting unless the mother’s or baby’s condition give cause for alarm and intervention.

The result of these advances in obstetric care during labour has been a growing sensitivity to the woman and her feelings during birth and an increasing respect for a non-interventionist approach to birth.

As most births may be regarded as normal (possibly about 85%) and only a few (the remaining 15%) will require the assistance of specialized obstetric care, a growing acceptance and endorsement of the midwife as the primary care giver in labour has also been seen in recent years. Good training for midwives so that they are well versed in the early warning signs of impending complications has, consequently, become significantly more important in recent years as they become the acknowledged primary providers of care during pregnancy and birth worldwide.

While the routine use of equipment to monitor labour and interventions to speed it up are not justified by research, their use may well be beneficial when medically indicated.

FURTHER WORK/HOMEWORK

Participants should read the handout on Artificial rupture of membranes and make a note of the arguments for and against the use of amniotomy. If it is routine to rupture the membranes in the place where you work, be prepared to discuss this with your colleagues and those in management positions. Ask them to review this policy in the light of this paper.

GROUP WORK

Discuss situations you have observed in the care of women in labour where the woman has not been shown respect, sensitivity and gentle care. Discuss what could be done to improve the quality of care for women in labour.

Support required during labour

Childbirth is considered to be a unique event that should provide lasting satisfaction for the mother and for those who share this event with her.

It is recognized that a mother has a heightened awareness in labour and the behaviour of those in attendance will have a lasting effect upon her. Even something as simple as someone’s abrupt tone of voice or failure to explain what is happening can detrimentally affect the experience for her. A bad experience of labour may interfere with her full recovery. In severe cases, such an
experience could lead to nightmares and to a permanent revulsion towards childbirth which, in turn, can affect both the mother’s relationship with her baby as well as her marital relationship, not to mention her perceptions of herself as a woman and a mother. It is, therefore, necessary to recognize the consequences of insensitive care during labour and to facilitate the experience of birth for women and for their chosen companions as much as possible.

Women should never be left alone during labour. Ideally one midwife should be allocated to care for one woman during labour. The role of the midwife is to provide emotional support throughout labour and not simply to record vital signs in a clinical manner. The mother’s experience of labour depends, to a great extent, on the personal relationship established with her attendant. This component of care is regarded as so important that some developed countries have included the recommendation that women should have one-to-one support throughout labour in their national guidelines (e.g. Canada).

The attendant must make sure the mother understands the purpose of every medical procedure and the result of every examination if she appears interested or responsive to the offer to explain events to her. She must be kept informed of progress and given updates of the expected time of the delivery.

Research has indicated that having a supportive companion present in labour (in addition to the midwife) has remarkably beneficial effects on the progress of labour, birth outcomes and postpartum maternal adjustment, mother–baby interactions and breastfeeding, and marital adjustment (see handout on *Companionship in labour*). Some of the improved outcomes are quite dramatic, with significant reductions in the length of labour, Caesarean sections, the amount of pain medication needed and the need for emergency care for the newborn baby. In addition, breastfeeding, infant wellbeing and marital harmony are facilitated in mothers who are supported by a companion during labour and delivery. Sometimes the husband/partner may be the ideal companion; in other settings another woman has proved to be a more useful companion. This woman may be the woman’s own mother (or mother-in-law), a sister or a friend or simply a companion provided by the hospital but unknown to the woman prior to her delivery. The choice of the companion must be that of the woman in labour.

Encouraging the woman to be accompanied during labour and delivery by a chosen companion (or two) has proved more beneficial for birth outcomes than most interventions which are commonly practised and often found to be worthless by good research trials.

While the companion can provide physical support for the woman (such as offering to massage her back or wipe her brow), his or her real value is the provision of emotional support and encouragement (through praise) for the woman.

**Facilities available: place of delivery**

It is important to ensure that all personnel attending a mother in labour have the necessary knowledge, skills and equipment to carry out a clean, safe delivery. They must recognize complications promptly and refer to an appropriate level of obstetric care, if necessary. Although pregnancy and childbirth are natural processes they are by no means free of risk. Women and children suffer and die because they do not have access to the basic minimum of health care that is their right. Worldwide, only about half the women in labour have someone nearby who can help if things go wrong.
WHO defines a safe delivery as one that is clean and carried out by someone who has the necessary skills. A birth does not necessarily have to take place in hospital for it to be safe. Birth at home is accepted and encouraged in many parts of the world, both developed and developing, and may be quite safe for a woman provided she has skilled attendance during pregnancy and labour and access to emergency medical care if needed. Many alternatives to both home and hospital birth have developed in recent years, including independent birth centres, birth clinics, or home-like birthing rooms in hospital settings. All of these try to provide a less clinical environment for birth while simultaneously providing access to safe care. Common to them all is the need to provide a private place for a woman (with consideration for her wishes) during birth. In many centres access to the room is strictly limited (through doors locked from the inside) so that strangers, whether professional or not, cannot enter the room freely. In this way a woman’s privacy during this very personal experience is protected.

In the same way, approaches to birthing in recent years have moved strongly towards preserving and respecting women’s dignity and privacy at all times. Routine internal examinations should be reduced to the minimum required for safe medical care and should always be done with the woman’s involvement, readiness and consent. Women should be given whatever covering they need to feel comfortable at all times and consideration should be given to the provision of appropriate and dignified sanitary requirements. Sanitary pads, for example, should be provided together with the means to hold these on for women who are leaking amniotic fluid or who have postpartum bleeding. Soiled bed-linen is to be expected and women should not be made to feel embarrassed when this occurs. In most cases women are encouraged to bring whatever gowns or personal sanitary requirements they want with them to the birth setting for use before, during or after the birth. Care should be taken that women do not have to walk in public areas during labour or after birth and should be protected from the curious eyes of onlookers. Beds in labour rooms should be turned away from the door or windows so that women in delivery are not left exposed for passers-by to view.

While these admonitions appear to be obvious and perhaps even uncalled-for in a manual of this nature, it is remarkable how little attention is sometimes paid to these basic rights of women in labour and there is, unfortunately, still a need to specify their importance.

GROUP WORK
Where are mothers normally delivered in your unit? How can this be made more private?
What procedures are routinely performed in all labours in your unit. How well do these practices match the WHO recommendations for birth outlined in the reading handouts?

An example of a hospital protocol for care in labour is included in the handouts for your reference. This outlines the types of care that could be routinely offered in labour.
Module 10. Reading
WHO’s Appropriate technology for birth revisited

In August 1985 the Lancet published the WHO recommendations for birth in an article entitled “Appropriate technology for birth”. This publication followed the appearance, in the same year, of the WHO book Having a baby in Europe, which described the current status of childbirth care in Europe. Both these publications resulted in controversy as to their validity. In many, if not most, parts of Europe as well as in other regions this controversy continues.

Questions such as: How were the publications arrived at? How representative are their contents? Are these biased, “liberal” views? And, most importantly, how well do these recommendations match up to research findings?

Development of the WHO recommendations for birth

The United Nations declared 1979 as the International Year of the Child. At the Regional Committee for Europe that year, concern was expressed over a number of issues including the rapidly expanding technology being applied to birth with its associated rising costs, the doubling or even tripling of the Caesarean section rate which took place in the 1970s and the question of whether this was associated with the increasing use of electronic fetal heart rate monitoring, the increasing demands from women’s groups to resume control over their birth experiences, and the poorly understood inequities relating to perinatal mortality (Wagner 1991).

The outcome of this debate was a decision by WHO to undertake research into perinatal services and to develop recommendations for appropriate technology for birth.

A series of events followed. The first was the establishment of a multidisciplinary, 15-member, perinatal study group. This consisted of representatives from obstetrics, paediatrics, nursing, midwifery, epidemiology and statistics, health administration, sociology, psychology, anthropology, economics and consumer groups. Meeting at least once a year as a full group, and more frequently in subgroups, the team investigated the available literature, the perinatal services in 23 of the then 32 WHO European Member States, mother–infant contact practices in a detailed study of ten representative Member States and alternate (meaning outside the formal health care system) perinatal services in Europe, as well as in the United States and Canada (Wagner 1991).

Debate and eventual consensus between the members of the team resulted in Having a baby in Europe (WHO 1985). This was directed towards lay readers; Perinatal health services in Europe: searching for better childbirth (WHO, 1985) was aimed at the academic reader.

The second major step in the process followed: the organization of birth conferences. These were national conferences designed to debate the applicability of the recommendations of the WHO books to a country. These conferences have almost always involved professionals and consumer groups as well as nongovernmental organizations and the media. To date 43 conferences have been held in 23 European Member States, as well as in the United States, Canada, Australia and China (Wagner 1991).

The birth conference movement led to three major interregional meetings. These, combining in particular the WHO areas of Europe and America, covered appropriate technology for pregnancy, for birth and for after the birth. These conferences always involved multidisciplinary
representation and required participants to submit their papers well in advance to enable translation and circulation before the meeting. At the conference issues were debated until consensus was reached. The outcome of these deliberations was published in the *Lancet* (WHO 1985).

**How valid are these recommendations?**

There is no doubt that much deliberation, research and discussion went into the development of the WHO recommendations for appropriate technology at birth. Nevertheless, some questions persist. How valid are these recommendations? How representative were the participants in the various conferences and research teams? Is it not possible, if not probable, that individuals willing to participate in such meetings and activities would have an interest in “changing the system” and would be biased? Most important, how well do the recommendations match up to research findings?

The recent publication by Chalmers et al. (1989) encompassing a careful scrutiny of randomized control trials of perinatal technology allows these questions to be answered. This two volume tome contains many reviews of great value but of particular relevance here are the four appendices. These list the forms of perinatal technology that: (a) reduce the negative outcomes of pregnancy and childbirth; (b) are promising but require further evaluation; (c) have unknown effects and require further evaluation; and (d) should be abandoned in the light of the available evidence.

The WHO recommendations for appropriate technology for birth are examined in Table 1 in terms of their classification by Chalmers et al. (1989). This appendix deals only with the specific birth technology recommendations and does not assess the general recommendations regarding perinatal health care policy and the setting of policy.

The recommendations of the WHO for appropriate technology at birth, developed through survey research, discussion and debate, are strongly endorsed by the findings of carefully controlled and critically evaluated randomized control trials. The recommendations provide sound guidance for those providing perinatal care.

Beverley Chalmers  
Consultant  
WHO Regional Office for Europe  
Maternal and Child Health

**References**


### Table 1. WHO recommendations for birth classified according to Chalmers et al. (1989)

<table>
<thead>
<tr>
<th>WHO recommendations</th>
<th>Chalmers et al. (1989)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The wellbeing of the new mother must be ensured through free access of a chosen member of her family during birth and throughout the postnatal period. In addition, the health team must provide emotional support.</td>
<td>Enhanced social and psychological support from care givers reduces negative outcomes. Leaving women unattended during labour should be abandoned.</td>
</tr>
<tr>
<td>Women must participate in decisions about their birth experiences.</td>
<td>Failing to involve women in decisions about their care should be abandoned.</td>
</tr>
<tr>
<td>The healthy newborn must remain with the mother whenever possible.</td>
<td>Separating healthy mothers and babies routinely should be abandoned.</td>
</tr>
<tr>
<td>Immediate breastfeeding should be encouraged even before the mother leaves the delivery room.</td>
<td>Unrestricted mother–infant contact after delivery and unrestricted breastfeeding reduce breastfeeding failure.</td>
</tr>
<tr>
<td>There is no justification to have a Caesarean section rate of higher than 10–15%. Vaginal deliveries after a Caesarean section should be encouraged.</td>
<td>Repeating Caesarean section routinely after previous Caesarean section should be abandoned. (There is little improvement in outcome with rates above 7%).</td>
</tr>
<tr>
<td>Electronic fetal monitoring should not be routine.</td>
<td>Routine continuous monitoring of fetal heart rate without fetal scalp blood sampling should be abandoned.</td>
</tr>
<tr>
<td>There is no indication for shaving pubic hair before delivery.</td>
<td>Shaving the perineum routinely should be abandoned.</td>
</tr>
<tr>
<td>There is no indication for routine enemas before delivery.</td>
<td>Administering enemas or suppositories routinely should be abandoned.</td>
</tr>
<tr>
<td>The dorsal lithotomy position during labour and delivery is not recommended. Women must decide which position to adopt for delivery.</td>
<td>Restricted maternal position during labour and delivery should be abandoned. Upright versus recumbent position during first and second stage reduces negative outcome.</td>
</tr>
<tr>
<td>Systematic use of episiotomy is not justified.</td>
<td>Performing episiotomy routinely should be abandoned.</td>
</tr>
<tr>
<td>Induction of labour should be reserved for specific medical indications.</td>
<td>Inducing labour routinely at less than 42 weeks gestation should be abandoned.</td>
</tr>
<tr>
<td>The routine administration of analgesic or anaesthetic drugs should be avoided.</td>
<td>Prescribing sedatives or tranquilizers routinely should be abandoned.</td>
</tr>
<tr>
<td>Artificial early rupture of membranes, as a routine process, is not justifiable.</td>
<td>Amniotomy to augment spontaneous labour appears promising but requires further evaluation.</td>
</tr>
</tbody>
</table>
Module 10. Reading
Summary: Artificial rupture of membranes

Since the 1970s there has been an increase in medical involvement in childbirth. While some medical procedures are beneficial, others carry risks to both mother and child.

The Association for Improvement of Maternity Services (AIMS), a group of organizations in the United Kingdom with a common interest in maternity issues was gravely concerned about the introduction of medical interventions without scientific evaluation.

In 1985, according to WHO, the medical intervention rate in the United Kingdom was higher than for other European countries. It was thought that this was related in some degree to the self-interest and satisfaction of obstetricians who, in many instances, had assumed total control of the labour system.

Many professionals consider a short labour to be beneficial to mother and baby. As a result it has in many areas become common practice to accelerate spontaneous labour firstly by rupturing the membranes (amniotomy). This “enables” assessment of the fetal state through attaching an electrode to the fetal scalp for continuous fetal heart rate recording. It is also argued that amniotomy will allow abnormalities of the amniotic fluid to be detected (i.e. meconium).

Artificial rupture of membranes (ARM) is undeniably a relatively minor procedure, but a policy of frequent amniotomy raises important questions about whether the mothers have given informed consent and whether they have been allowed their right to choose how their labour is managed.

In normal labour the membranes rupture as a result of the force exerted by uterine contractions. As long as the membranes are intact the pressure of contractions is exerted through amniotic fluid and distributed equally over the fetus, the umbilical cord and the placenta. Although the pressure of contractions intensifies as labour progresses, undue compression is avoided while the membrane remains intact. Membranes normally rupture spontaneously at the end of the first stage of labour or during the second stage. The blood flow and oxygen transfer to the fetus is less likely to be affected while the membranes are intact.

Research by Brontanek and Hodr (1968) concluded that amniotomy produced a long-lasting reduction in uterine blood flow. Donald (1966) states that the advantage of not rupturing the membranes was an “intact mother and baby”. Apart from the reduced likelihood of infection, fetal asphyxia is less likely, both because the umbilical cord is less likely to be compressed and because retraction of the placental site – with impairment of the utero-placental circulation – will not occur if the membranes remain intact. These findings were supported by various researchers including Schwartz (1961), Althaba (1969), and Caldeyro-Barcia, et al. (1972).

Caldeyro-Barcia (1974) commented on the undesirable effects of early rupture of membranes. The adverse perinatal effects were also suggested by other researchers (Martell et al. (1976), Steer, et al. (1976), a small study by Aladjem (1977)). Steward et al. (1982), however, suggested otherwise, drawing the conclusion that there were no detrimental effects to the fetus from early amniotomy. Leaving the membranes intact is seen as a disadvantage by some, although there is a distinct lack of evidence to support this view.

One obstetric view of ARM is that the membranes should be ruptured artificially once the external os starts to dilate as, it is argued, it allows the fetal head to descend. This may allow
greater nerve stimulation leading to stronger contractions and more rapid dilatation. Mitchell (1976) found there was an increased prostaglandin production after amniotomy was performed.

After consideration of the evidence, the option of WHO (in Having a baby in Europe (1985)) was that “early rupture of the membranes as routine procedure is not scientifically justified”.

Only very rarely have mothers been asked for their views. However, Henderson (1984), in her study, found that the majority of mothers did not think amniotomy to be necessary but some felt that the midwife (as a professional) knew best.

Recent randomized control trials have indicated, with superior research methodologies to those used in earlier studies, that the 1985 conclusions of WHO are supported by research, and that artificial rupture of membranes is not routinely necessary in labour.
Module 10. Reading
Companionship to modify the clinical birth environment: effects on progress and perceptions of labour, and breastfeeding

G. Justus Hofmeyr, V Cheryl Nikodem, Wendy-Lynne Wolman, Beverley E. Chalmers, Tami Kramer

British Journal of Obstetric and Gynaecology

Abstract

Objective – To measure the effects of supportive companionship on labour and various aspects of adaptation to parenthood, and thus by inference the adverse effects of a clinically orientated labour environment on these processes.

Design – Randomized controlled trial.

Setting – A community hospital familiar to most of the participants, with a conventional, clinically-orientated labour ward.

Subjects – Nulliparous women in uncomplicated labour.

Intervention – Supportive companionship from volunteers from the community with no medical nor nursing experience, concentrating on comfort, reassurance and praise.

Main outcome measures – Duration of labour, use of analgesia, perceptions of labour and breastfeeding success.

Results – Companionship had no measurable effect on the progress of labour. Diastolic blood pressure and use of analgesia were modestly but significantly reduced. The support group was more likely to report that they felt that they had coped well during labour (60 vs. 24% 7 P <0.00001). Their mean labour pain scores (26.0 vs. 44.2, P <0-00001) and state anxiety scores (28.2 vs. 37.8, P <0-00001) were lower than those of the control group. Compared with the control group (ii = 75), at six weeks women in the support group (n = 74) were more likely to be breastfeeding exclusively (51 vs. 29%, P<0.01); and to be feeding at flexible intervals (81 vs. 47%, P<0-0001).

Conclusions – Labour in a clinical environment may undermine women’s feelings of competence, perceptions of labour, confidence in adapting to parenthood and initiation of successful breastfeeding. These effects may be reduced by the provision of additional companionship during labour aimed to promote self-esteem.

There is increasing recognition of the impact of social factors on health (Editorial 1988; Schwarzer and Leppin 1989). Modern obstetrics has tended to isolate labouring women from the community contacts that were a feature of childbirth in preindustrialized societies (Kennell and Klaus 1988). In recent years, policies in many hospitals have been revised and companions, usually male partners, have been encouraged to be present during labour. There is little well-controlled evidence that the presence of male partners has a favourable effect on the progress of labour or its outcome (Keirse et al. 1989). The observable support given by first-time fathers has been unfavourably compared with that provided by female labour companions or “doulas” (Bertsch et al. 1990).
The provision of medical care for childbearing women has been associated with improvements in the immediate outcome of pregnancy for mothers and their babies. At the same time, problems following childbirth such as failure to breastfeed successfully, failure to cope well as a mother and postnatal depression are widespread. It is important to question the extent to which modern-day obstetric practices contribute to either the positive or the negative features of contemporary childbirth (Oakley 1980).

Klaus et al. (1986) have shown that women from a rural background admitted to a large, western style hospital in Guatemala experienced considerably shorter labours and fewer complications when randomly assigned to receive continuous support from a female companion during labour. The extent of the improvements observed may be viewed as a measure of the extent to which those without the companionship were failing to achieve their biological potential and, therefore, as an indication of the adverse effects of the clinical environment on the labour process. Similar results have been reported from a public hospital in Houston serving a low-income population, with high use of technology and rates of intervention (Kennell et al. 1988). The potential for physiologically improved labour function may be less in environments in which the sense of isolation and unfamiliarity is less extreme than that described in the Guatemala study, or where medical interventions are less frequent than in the Houston study. On the other hand, there may be less obvious adverse effects of the conventional clinical environment on the process of labour and adaptation to parenthood.

Studies of general social support during pregnancy in industrialized communities have tended to show positive psychosocial benefits but a lack of demonstrable physiological improvements (Oakley 1989). In an affluent, low risk North American population with high rates of obstetric intervention, intrapartum professional support was associated with significantly reduced use of analgesia and rate of episiotomy, but not reduced labour length nor rate of Caesarean section (Hodnett and Osborn 1989).

We have investigated the hypothesis that during labour women may be uniquely vulnerable to environmental influences; that modern obstetric care may have an adverse effect on the progress of labour and on the development of feelings of competence and confidence; that this may in turn impair adjustment to parenthood and establishment of breastfeeding; and that this process may to some extent be reversed by the provision of positive support and companionship during labour.

**Subjects and methods**

The study was conducted at Coronation Hospital, a community hospital serving a low-income urban population. Advertisements were placed in the hospital and local churches asking for help from women prepared to act as labour supporters. The work was to be voluntary, though a nominal allowance to help with expenses would be paid (about £3 sterling per day). Twenty women responded and were interviewed by two of the authors (W-L.W. and G.J.H.). They were asked about their reasons for volunteering and their attitudes to childbirth and the need for emotional support during labour. Role-play was used to assess their ability to express empathy. Three were selected to act as labour companions. They were asked simply to stay with those labouring women to whom they were allocated as continuously as possible, and using touch and speech to concentrate on three primary functions: comfort, reassurance and praise.

Nulliparous women in established labour without significant obstetric complications whose cervices were less than 6 cm dilated and who had no supportive companion with them were
asked to participate in the study. The details of the study were explained, in particular that participants would have only a one in two chance of being accompanied during the rest of the labour by a companion. Baseline clinical details of the participants were recorded and a brief questionnaire completed. Blood pressure and pulse were measured using a non-invasive monitor (Dinamap, Critikon, Johnson & Johnson Ltd.). Blood samples were collected from the intravenous line that was routinely employed to ensure adequate hydration in nulliparous women in the labour ward.

Participants were then allocated by means of randomly ordered cards in sealed opaque envelopes to a study and a control group. Those in the study group were introduced to one of the supporters who stayed with her at least for several hours, and in most cases until her baby was born. Participants were enrolled in the mornings only, as the supporters were not expected to stay at the hospital after dark. In all other respects, the care received by both groups was identical. Clinical care was provided by the resident medical and nursing staff. The time nursing staff could spend with women in both groups was limited by the relatively small nursing complement in our busy labour ward.

One hour after enrolment, venous blood was again collected and the blood pressure and pulse measurements repeated. When possible, cord and maternal blood are collected at delivery. Details of the labour and delivery were obtained from the hospital notes.

The next morning, within 24 hours of delivery, a structured interview was conducted by a clinical psychologist (W-L.W.). For all but the last few questions, which related to the support received in labour, the interviewer was blind to the allocation of each woman.

Letters were written to the participants reminding them to attend the six week postnatal clinic and, if they failed to do so, further letters were sent and telephone calls made. At the postnatal visit, a further interview was conducted. It was not possible to ensure that the interviewer was always blind to the group allocation, as sometimes the participants volunteered information which identified them as belonging to one or other group.

Statistical comparisons of continuous data were by the Mann-Whitney U test. Proportions were compared by means of the 95% confidence intervals (CI) of the odds ratios and the X²-test.

The protocol was approved by the committee for research on human subjects of the University of the Witwatersrand.

Results

Of the 190 women approached, 189 agreed to participate in the study and 92 were randomly allocated to the support and 97 to the control group.

The randomization process succeeded in producing groups which were very well matched for all the baseline data recorded, except for a slight imbalance in the racial composition. This discrepancy was considered too small to have materially altered the results (Table 1). Similar proportions were unmarried (support 79%, control 81%), Protestant (64%, 64%), Catholic (16%, 15%), Moslem or Hindu (14%, 13%), previously employed (45%, 44%), scholars (9%, 13%), had household monthly incomes below £200 (73%, 64%) and had completed more than 10 years of education (63%, 64%). Similar proportions strongly acknowledged that they felt excited (46%, 47%), worried (43%, 38%), sad (15%, 8%), afraid (46%, 43%), in pain (78%, 84%) and
anxious (41\%, 42\%) and appeared to be moderately (46\%, 53\%) or severely (12\%, 12\%) distressed.

Table 1. Baseline information expressed as mean (SE) values or proportions (%)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Support</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>91</td>
<td>97</td>
</tr>
<tr>
<td>Gestation (weeks)</td>
<td>92</td>
<td>97</td>
</tr>
<tr>
<td>Labour induced</td>
<td>92</td>
<td>97</td>
</tr>
<tr>
<td>Draining amniotic fluid</td>
<td>92</td>
<td>97</td>
</tr>
<tr>
<td>Occipito-anterior</td>
<td>84</td>
<td>91</td>
</tr>
<tr>
<td>Blood pressure (mmHg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Diastolic</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Pulse (/min)</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>Cervix dilated (cm)</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Contractions (/10 min)</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Fetal heart rate (/min)</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Low variability</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Decelerations</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Previous analgesia</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Oxytocin augmentation</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Race: Asian</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Black</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Coloured</td>
<td>92</td>
<td>92</td>
</tr>
</tbody>
</table>

One woman in the control group left the hospital before completing the 24 hour questionnaire, and could not be traced.

The biochemical results and psychosocial follow-up of the mothers and their babies will be considered elsewhere. This report is concerned with the comparisons between the two groups relating to labour and its perception, and breastfeeding.

Labour companionship had no measurable effect on the frequency of uterine contractions one hour after entry to the study, the rate of cervical dilatation in the first four hours, the use of oxytocics and amniotomy, or the duration of labour (Table 2). One hour after enrolment the blood pressures in the control group were somewhat lower than in the support group, the difference between diastolic pressures being statistically significant. The fetal heart rate was also slightly but not quite significantly, lower.

The overall number who required analgesia with pethidine and hydroxyzine (Aterax) was not different, but the first dose after enrolment was required earlier in the control group, and there was a trend towards more in the control group needing subsequent dose.

The rate of operative deliveries was similar in the two groups. Meconium-staining of the amniotic fluid at the time of spontaneous or artificial rupture of the membranes tended to be more common in the support group. All other measures of neonatal wellbeing tended to favour the support group, but none of the differences was statistically significant.
In contrast to the modest measurable effects on the physiological progress of labour, the psychological responses and perceptions of the groups were strikingly different (Table 3). The day after delivery the trait anxiety score (Spielberger 1983) and the self-esteem score (Coopersmith 1967), which measure stable personality characteristics and should not be influenced by recent events, were the same in the two groups. The state (current) anxiety score was significantly reduced in the support group. Fewer in the support group described their labour pain as “severe”, and the McGill pain rating index for labour pain (Melzack 1975) was about half that of the control group. Fewer described their pain at the time of questioning as “moderate” or “severe”. Fewer described the labour as “very difficult” or “much worse than they had imagined it would be”, or felt that they had been “very tense”, while more felt that they had coped well with the labour.
At six weeks after delivery, women in the support group were significantly more likely to be breastfeeding their babies exclusively (Table 4). They were about four times less likely to report having experienced feeding problems, three times less likely to have started foods other than breast or bottled milk, and almost twice as likely to be feeding at flexible intervals rather than by schedule.

Comparison of the main reasons given for stopping breastfeeding showed that what distinguished the groups was the greater number in the control group who had stopped because of a perception of having inadequate breast-milk.

To investigate the possibility that participation in the study without being allocated to receive support may have had an adverse effect on the control group, 30 women who were not enrolled prospectively in the study because they had been admitted in labour over a weekend or in the
evening, but whose records showed that they would have met the criteria for enrolment, were approached the day after delivery, and all agreed to complete the 24 hour questionnaire. The results in Table 5 show that their responses were very similar to those of the randomized control group, and different to those of the support group.

### Table 5. Comparison of randomized groups with retrospectively selected control group. Data expressed as mean (SE) values or proportions (%)

<table>
<thead>
<tr>
<th></th>
<th>Randomized groups</th>
<th>Retrospective control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Support</td>
</tr>
<tr>
<td>Age (years)</td>
<td>91</td>
<td>20.5 (0.36)</td>
</tr>
<tr>
<td>Gestation (weeks)</td>
<td>92</td>
<td>39.4 (0.16)</td>
</tr>
<tr>
<td>Unmarried</td>
<td>92</td>
<td>73 (79%)</td>
</tr>
<tr>
<td>Race: Asian</td>
<td>92</td>
<td>12 (13%)</td>
</tr>
<tr>
<td>Black</td>
<td>92</td>
<td>7 (7.6%)</td>
</tr>
<tr>
<td>Coloured</td>
<td>92</td>
<td>73 (79%)</td>
</tr>
<tr>
<td>Education &gt;10 years</td>
<td>92</td>
<td>58 (63%)</td>
</tr>
<tr>
<td>Labour duration (h)</td>
<td>92</td>
<td>9.6 (0.41)</td>
</tr>
<tr>
<td>Birthweight (g)</td>
<td>92</td>
<td>3093 (45.5)</td>
</tr>
<tr>
<td>Trait anxiety score</td>
<td>92</td>
<td>40.2 (0.94)</td>
</tr>
<tr>
<td>State anxiety score</td>
<td>92</td>
<td>28.2 (0.85)</td>
</tr>
<tr>
<td>Labour pain severe</td>
<td>92</td>
<td>53 (57.6%)</td>
</tr>
</tbody>
</table>

### Discussion

The contribution of modern obstetric care to improved perinatal outcome must be accounted for by the benefits of effective medical interventions in those women with complications of pregnancy. What has been unique in the field of childbirth has been the application of clinically orientated care on a wide scale to healthy individuals. Labour in particular has been defined as a high risk situation *de facto*, justifying the restrictions of clinical care on a routine basis. It is important to question whether such profound manipulations of the childbirth environment might have unsuspected adverse effects on the process of birth and adaptation to parenthood.

The dramatic effects on the physiological progress of labour found in the study of Klaus et al. (1986) did not occur in this study. This might be because the companionship provided was less effective, medical intervention was less frequent or because the adverse environmental effects were less intense, creating less scope for improvement. The latter explanation is most likely, as the participants differed from those in the Guatemala study in that they were western, educated urban working-class women in a familiar community hospital. On the other hand, the reduction in labour duration and complications in a high-technology environment demonstrated in the study of Kennell et al. (1988) may in part have been related to the lower rate of medical interventions, particularly epidural analgesia, in their support group. Epidural analgesia was not available to our patients.

The direction of blood pressure changes in our study was consistent with reduced anxiety in the supported group, but these changes were small.
Companionship, however, had a striking effect on the way that the participants reported experiencing labour. The various measures of labour pain were significantly reduced in the support group, and analgesia was needed significantly later after entry to the study. Supported women reported far more frequently feeling that they themselves had coped well during labour. If feelings of competence initiated during labour, a time of intense emotional impressionability, are of importance to a woman’s ongoing sense of competence as a mother and ability to breastfeed successfully, then this finding is of considerable importance.

In recent years, the direct benefits of breastfeeding for the physical health of babies have been increasingly recognized (Inch 1989). The possible contribution of successful breastfeeding to factors such as satisfaction and happiness in motherhood, the development of positive mother–infant relationships and the emotional development of babies are more difficult to measure; but may also be of importance. In communities without access to safe alternative feeding methods, breastfeeding success is literally a matter of life or death. The main cause of the high infant mortality rate in many such communities is gastroenteritis resulting directly from bottle-feeding (Irwig and Ingle 1984). If the provision of modern obstetric care for such communities has contributed to a significant increase in bottle-feeding, then the contribution to infant mortality may in fact outweigh any beneficial effects on perinatal mortality rates.

Breastfeeding success appears to be vulnerable to a number of direct and indirect factors. Review of the available evidence from randomized trials (Inch and Garforth 1989) has shown that breastfeeding success is adversely affected by restricted breastfeeding, giving free formula samples to breastfeeding mothers, combined estrogen/progesterone contraception, and restricted mother–infant contact after birth (Thomson and Westreich 1989). It is promoted by general social support during pregnancy (Elbourne et al. 1989), antenatal breastfeeding education (Inch 1989) and postnatal support for breastfeeding mothers (Inch and Garforth 1989). Randomized trials of procedures not directly linked to breastfeeding but which depart from the conventional restrictions of the clinical environment have also been shown to have positive effects on breastfeeding success. These include ambulation during labour (Broadhurst et al. 1979) and early discharge from hospital (Hellman et al. 1962). These results indicate that conventional hospital care may interfere with the development of the confidence needed to breastfeed successfully.

In our study, women in the support group experienced significantly greater breastfeeding success and fewer feeding problems, and were more likely to use a flexible approach to feeding time.

The possibility that factors other than the labour companionship could have accounted for these differences needs to be explored. The labour companions were not aware that breastfeeding was one of the end-points of the study, and it was confirmed in retrospect that they on no occasion discussed breastfeeding nor helped with the first feed after birth. They did not visit the participants in the postnatal wards. Occasionally participants would seek them out in the hospital and on one occasion at home, but only to show them how the baby was progressing, and breastfeeding advice was not given at this time either.

Differences in the progress of and interventions in labour might also have affected breastfeeding success. In fact, these were very small, except for slightly less use of analgesia in the support group.

The possibility must be considered that those who had received the labour support replied more positively to the subjective questions out of a desire to please the researchers. A good test of validity of the interview is given by the trait anxiety questionnaire, which is designed to measure...
long-term anxiety and should not be much affected by recent events. The consistency of these scores indicates that subjective bias between the groups is most unlikely.

To explain the pronounced and persistent effects on feelings, perceptions and behaviour of a relatively short-lived intervention, we need to accept the premise that labour is a time of unique sensitivity to environmental factors, and that events and interactions during labour may have far-reaching and powerful psychological consequences. Given the fact that very few human experiences approach in intensity the levels of stress, anxiety, pain, exertion and emotional tumult which occur during labour, this is not surprising.

We have attempted to analyse the characteristics of the labour support provided in this study. It was not informative except to the extent of simple advice derived from personal experience, as the companions had no medical, nursing nor traditional midwifery experience, but all had children of their own. The factors we think were of importance are as follows: firstly, the companions were not part of the hospital medical or nursing hierarchy, and therefore may have been seen as an ally without a vested interest in the hospital establishment. Secondly, they were drawn from the same community and would be able to communicate easily with and share common values with the participants. Thirdly, they were not known personally to the participants and this might have avoided feelings of having to meet expectations or keep up appearances which may occur when women are supported during labour by a friend, family member or known midwife or antenatal educator. Fourthly, the specific elements on which the companions were repeatedly reminded to concentrate were comfort, reassurance and praise. The last was emphasized because of our hypothesis that an important way in which the clinical environment might impair the process of birth and adaptation to parenthood might be by undermining women’s sense of achievement and development of confidence as mothers. Fifthly, the emotional support given seemed to be genuine. The companions worked as volunteers (though the small expense allowance might have been a motive) and were selected on the basis of appearing to have a genuine desire to help women in labour. They showed a remarkable ability to maintain a commitment to their vocation, with the exception of one supporter who after some weeks became distracted by personal problems and was withdrawn from her supporting role. She was asked to help with clerical work instead. An illustration of the extent to which the support and praise given was genuine is provided by the response of one of the supporters to the one occasion on which a participant visited her at home and brought her a gift. She said that she felt guilty as she had really done nothing; it was the woman herself and the nursing staff who had done everything. And finally, quite apart from anything the companions did or said, the fact that someone with no other function whatsoever was allocated on a full-time basis to be with the women in labour may have conveyed the message of concern for and value of them as individuals.

How applicable are these results to other hospital situations? The participants were nulliparous and on the whole young, urban working-class women who were politically and socially disadvantaged. Many people, and most were from a community with a conventional Christian ethic. It would be expected that the results would be directly applicable at least to urban working-class women giving birth in a hospital setting in most parts of the world. How best to adapt the principles established in this study to more affluent communities, and those with very different cultural mores, will need further assessment. Further research will also be necessary to determine whether similar effects result from support by other categories of companions, particularly if differing from those in this study by being non-voluntary workers, part of the hospital hierarchy or an associate of the women in labour. The role of male partners, in particular, involves complex and variable relationship factors that are difficult to assess.
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References


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Module 10. Reading
WHO recommendations on appropriate technology for birth
Conference at Fortaleza, Brazil, 22–26 April 1985

The Regional Office for Europe and the Regional Office for the Americas of the World Health Organization held a joint conference that was attended by over 60 participants from North and South America and Europe, representing midwives, obstetricians, paediatricians, health administrators, sociologists, psychologists, economists and service users. The conference made a number of recommendations based on the principle that each woman has a fundamental right to receive proper prenatal care; that the woman has a central role in all aspects of this care, including participation in the planning, carrying out and evaluation of the care; and that social, emotional and psychological factors are decisive in the understanding and implementation of proper prenatal care.

General recommendations

1. Health ministries should establish specific policies about the incorporation of technology into commercial markets and health services.

2. Countries should develop the potential to carry out cooperative surveys to evaluate birth care technology.

3. The whole community should be informed about the various procedures in birth care, to enable each woman to choose the type of birth care she prefers.

4. Women's mutual aid groups have an intrinsic value as mechanisms for social support and the transfer of knowledge, especially with relation to birth.

5. Informal perinatal care systems (including traditional birth attendants), where they exist, must coexist with the official birth care system and collaboration between them must be maintained for the benefit of the mother. Such relations, when established in parallel with no concept of superiority of one system over the other, can be highly effective.

6. The training of people in birth care should aim to improve their knowledge of its social, cultural, anthropological and ethical aspects.

7. The training of professional midwives or birth attendants should be promoted. Care during normal pregnancy and birth, and following birth should be the duty of this profession.

8. Technology assessment should be multidisciplinary and involve all types of providers who use the technology: epidemiologists, social scientists and health authorities. The women on whom the technology is used should be involved in planning the assessment as well as evaluating and disseminating the results. The results of the assessment should be fed back to all those involved in the research as well as to the communities where the research was conducted.

9. Information about birth practices in hospitals (rates of Caesarean section, etc.) should be given to the public served by the hospitals.

10. The psychological wellbeing of the new mother must be ensured not only through free access to a relation of her choice during birth but also through easy visiting during the postnatal period.

11. The healthy newborn must remain with the mother, whenever both their conditions permit it. No process of observation of the healthy newborn justifies a separation from the mother.
12. The immediate beginning of breastfeeding should be promoted, even before the mother leaves the delivery room.

13. Countries with some of the lowest perinatal mortality rates in the world have Caesarean section rates under 10%. Clearly there is no justification in any specific geographic region to have more than 10–15% Caesarean section births.

14. There is no evidence that a Caesarean section is required after a previous transverse low segment Caesarean section birth. Vaginal deliveries after a Caesarean should normally be encouraged wherever emergency surgical capacity is available.

15. There is no evidence that routine intrapartum electronic fetal monitoring has a positive effect on the outcome of pregnancy. Electronic fetal monitoring should be carried out only in carefully selected medical cases (related to high perinatal mortality rates) and in induced labour. Countries where electronic fetal monitors and qualified staff are available should carry out investigations to select specific groups of pregnant women who might benefit from electronic fetal monitoring. Until such time as results are known, national health care services should abstain from purchasing new monitoring equipment.

16. There is no indication for pubic shaving or a pre-delivery enema.

17. Pregnant women should not be put in a lithotomy position during labour or delivery. They should be encouraged to walk about during labour and each woman must freely decide which position to adopt during delivery.

18. The systematic use of episiotomy is not justified. The protection of the perineum through alternative methods should be evaluated and adopted.

19. Birth should not be induced for convenience and the induction of labour should be reserved for specific medical indications. No geographic region should have rates of induced labour over 10%.

20. During delivery, the routine administration of analgesic or anaesthetic drugs, that are not specifically required to correct or prevent a complication in delivery, should be avoided.

21. Normally, rupture of the membranes is not required until a fairly late stage in the delivery. Artificial early rupture of the membranes, as a routine process, is not scientifically justified.

**Implementation of recommendations**

1. Governments should identify, within the structures of their health ministries, units or departments to take charge of promoting and coordinating the assessment of appropriate technology.

2. Funding agencies should use financial regulations to discourage the indiscriminate use of technology.

3. Obstetric care services that have critical attitudes towards technology and that have adopted an attitude of respect for the emotional, psychological and social aspects of birth care should be identified. Such services should be encouraged and the processes that have led them to their position must be studied so that they can be used as models to foster similar attitudes in other centres and to influence obstetrical views nationwide.

4. The results of the assessment of technology used in birth care should be widely disseminated, to change the behaviour of professionals and give a basis to the decisions of users and the general public.
5. Governments should consider developing regulations to permit the use of new birth technology only after adequate evaluation.

6. National and local birth conferences that include relevant health providers, health authorities, users, women's groups and the media should be promoted.
Module 10. Reading
Guidelines for care in labour

This policy must be read in conjunction with the following other policies and protocols:
Midwives Rules and the Code of Practice
Wiltshire Health Authority Drug Policy
Administration of Entonox

Aim

- To provide safe and individualized care for mother and baby (1)
- To provide a holistic approach
- To provide informed choices (2, 4) for the mother and her partner relating to:
  - positions in labour
  - monitoring fetal wellbeing
  - pain relief
  - episiotomy
  - management of the third stage of labour
  - haemorrhagic disease of the newborn (vitamin K preferences)
  - contact with the baby immediately postpartum
  - feeding intentions.

Procedure

- Each woman should be seen by a midwife within ten minutes of arrival (document the reason for any delay).
- On admission to the labour ward the initial assessment should include as a minimum:
  - a review of the maternity records including the birth plan
  - vital signs of the mother
  - abdominal palpation
  - monitoring of the fetal heart rate (4)
  - diagnosis of labour (the partogram must be commenced when in established labour).
- The midwife should be aware of the mother’s religious and cultural beliefs.
- Maternal, verbal consent should be sought for all procedures and documented.
- If a student is allocated to the mother it should be clearly documented which midwife is responsible and accountable for the care of the mother and baby.
Care in labour

Observations
Regular observations in labour are determined and documented by the midwife. In normal labour the following is a guide to good practice:

- **Blood pressure**:  
  - Recordings should be made hourly or more frequently at the discretion of the midwife.  
  - The method of fetal heart rate monitoring should be discussed with the woman and her named midwife and the woman’s choice should be documented (4). A minimum of half-hourly fetal heart rate recordings should be made during the first stage of labour or more frequently at the discretion of the midwife.
  
  - Quarter-hourly fetal heart rate recordings should be made during non-active second stage, or more frequently as labour progresses, at the discretion of the midwife.
  
  - Five-minute fetal heart rate recordings should be made during the active second stage, or more frequently at the discretion of the midwife.
  
  - If continuous monitoring is performed, the reason must be clearly documented.

- **Abdominal palpation** should be undertaken prior to a vaginal examination. Documentation should include:
  
  - contractions – frequency and strength
  
  - station of the presenting part – abdominal and in relation to the ischial spines
  
  - fetal lie and position
  
  - bladder assessment
  
  - fetal heart.

- **Vaginal examinations** should be undertaken every four hours in normal labour or more frequently at the discretion of the midwife.

- If it is necessary to rupture the membranes artificially, the reason must be clearly documented and the colour of the liquor noted.

- Any deviation from the norm must be reported to a senior midwife if available and the appropriate medical staff.

Nutrition in labour

- Low risk clients may be offered a light diet (see anaesthetic protocol).

- High risk clients should only be offered water.

- High risk clients should be given cimetidine 400 mg orally four to six times hourly.

Pain relief
Pain relief must be regularly reviewed and offered as per the mother’s choice.

Positions in labour and for birth
This should be discussed with the mother and her choices accommodated as far as is possible and safe.
Episiotomy

If an episiotomy is performed, the reason for it must be recorded. Local anaesthetic must be given prior to and for the repair of any trauma. Analgesia should be offered following the repair.

Third stage of labour

- Active management. Intramuscular syntometrine (ergometrine 0.5 mg and syntocinon 5 units) is recommended in all cases. If there is a history of raised blood pressure (>2 readings above 90 diastolic in labour) or severe asthma, consideration should be given to the intravenous administration of 10 units of syntocinon.
- Passive management at maternal request (this should be recorded in the maternity pack and birth register).

Neonatal resuscitation

In the event of a baby requiring resuscitation the midwife must “bag and mask” the baby until appropriate medical assistance arrives. Midwives are not expected to intubate (paediatric department 1996).

Immediately postpartum

A full assessment of maternal and fetal wellbeing must be made following delivery. Mothers should be given their babies to hold for an unlimited period with skin-to-skin contact within thirty minutes of delivery (or within thirty minutes of the mother being able to respond in the case of Caesarean deliveries) in a relaxed unhurried environment. They should be encouraged to initiate the first breastfeed as soon as the baby is receptive (3).

Rest, refreshment and analgesia should be offered prior to warding.

Transfer of the mother and/or mother and baby

When the mother and/or baby are transferred to another area there should be a midwife-to-midwife personal handover, e.g.:
- from the antenatal ward to the labour ward
- from the labour ward to the postnatal ward
- from a community unit to an acute unit.

Documentation

The name of the midwife caring for a mother should be clearly documented (i.e. your name should be printed in the maternity notes at handover).

All student midwives’ records must be countersigned.

Debrief

All midwives are encouraged to visit mothers they have delivered or cared for in labour to give the mothers the opportunity to talk through their experiences.

References


Module 10. Reading

REVIEW

Social support in labour – a selective review

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Abstract

Support during labour has been offered by a variety of different people, including fathers, professional medical staff, trained labour coaches and monitrices, untrained lay supporters and family and friends. A comparison of the various findings shows that support given by trained or lay untrained female supporters, who are not necessarily known to the labouring woman, yields the most extensive, methodologically sound, and consistently positive effects on obstetric and psychosocial outcomes. Although trained labour coaches have been shown to exert a positive effect on outcome, the results of doula support are the most impressive when both methodology and outcome effects are considered. Studies of father support have yielded contradictory findings, although women do appear to value their presence in most studies. Family and friends have not been shown to influence outcomes. Support from professional medical staff is rare, but when given, has, in some cases, had a positive effect. These findings are important for the field, since the use of lay supporters constitutes a low-cost preventive intervention. The inclusion of lay supportive women is also consistent with traditional practices in most countries in the world.

Zusammenfassung


Résumé

Le soutien pendant l’accouchement a été offert par des personnes très diverses, y compris les pères, les membres d’un personnel médical professionnel, des monitrices ayant reçu la formation
appropriée, des ‘non professionnels’, sans compter famille et amis. Une comparaison des résultats obtenus révèle que le soutien offert par des femmes professionnelles formées ou non professionnelles et non formées, que la femme en couches ne connaît pas nécessairement, produit les effets les plus importants, les plus valables au point de vue méthodologique et les plus régulièrement positifs aux points de vue obstétrique aussi bien que psychosocial. Bien qu’il ait été démontré que des monitrices formées à l’accouchement aient exercé un effet positif sur l’aboutissement, les résultats du soutien "doula" sont beaucoup plus impressionnants lorsque l’on considère les effets méthodologiques et le dénouement. Les études du soutien apporté par le père ont produit des résultats contradictoires, bien que, dans la majorité des études, les femmes aient semblé apprécié leur présence. La famille et les amis n’ont semblé exercé aucun effet sur l’aboutissement. Le soutien accordé par un personnel médical professionnel est rare mais, lorsqu’offert, a en certains cas exercé un effet positif. Ces résultats sont importants, étant donné que l’emploi de non professionnels constitue une intervention préventive peu coûteuse. L’inclusion de femmes non professionnelles est par ailleurs conforme aux traditions pratiquées dans la majorité des pays du monde.

* * *

Recent interest in the notion of labour support does not represent the discovery of a new idea. Cogan and Spinnato (1) and Kennell and co-workers (2) state that women have traditionally always had support of some kind during childbirth. Cogan (3) points out that support was usually given by an older woman. Prior to the relocation of the place of birth from home to hospital in industrialized countries, women were supported at home by family members and often assisted by a midwife (2).

The twentieth century has witnessed the increased medicalization of birth. Advances in obstetric practice have rendered greater physical health for mothers and babies. Unfortunately many of these advances have often focused only on the physical health of women and have disregarded traditional, cultural, social and psychological aspects of the experience of birth. One of the most serious results of this disregard has been the exclusion of supportive companions. Keirse and co-workers (4) point out that for the first 25 years of the hospital birth era the subjective experiences of mothers during labour and delivery were considered and consequently the distress of labouring alone was not recognized.

Cogan and Spinnatto (1) point out that with the medicalization of childbirth, nonmedical companions were often excluded from labour wards, and support, was assumed to be provided by nurses. Nurses, however, are usually responsible for the care of several labouring women at the same time (1). It has therefore been rare for continuous support to be offered to one individual woman by a single supportive nurse.

Increased technology in obstetrics has placed greater demands on midwifery staff to oversee equipment, leaving less free time to offer support or even to be with the woman in labour continuously.

Historically, with the emergence of childbirth education, the conscious participation of the woman in labour became a desired goal (3). Greater awareness of the emotional needs of women over the past few decades has led to a reintroduction into the labour ward of people designated specifically to provide companionship. Support of varying descriptions has been provided during labour by fathers, families, friends, trained supporters, untrained lay supporters, obstetricians and
nurses. The question of whether or not these people have rendered a positive effect on health outcome is the concern of this paper.

**Husbands in the labour ward**

The 1960s heralded the introduction of husbands – viewed as the primary support person (1) – into the labour ward in First World countries. Keirse and co-workers (4) suggest that husbands have entered the labour ward for two reasons. The first is an attempt to establish birth as a positive experience which should not exclude the woman’s partner, while another man presides over the birth. The second reason is to fill the gaps left by busy medical and nursing staff. Cogan (3) suggests that the inclusion of fathers as opposed to significant others may have been because they were involved and caring (p. 2), and also because they were available when other family members might have been geographically distant. The appeal of father support also lies in the promise that increased involvement of the father with the baby will foster the development of the future family bonds (2). The move from extended to nuclear family structures further favours the husband as the supportive birthing companion (5).

Bertsch and co-workers (6) cite figures for the United States which show that by 1983, 79% of women delivering in hospitals were accompanied by their husbands, whereas in 1973, only 27% of fathers were present. In most industrialized countries, it is now normal practice for fathers to be present throughout childbirth. Despite the initial reservations of hospital staff, the inclusion of fathers now enjoys widespread enthusiasm and support in Europe, North America, Australia and New Zealand (4). Nevertheless, if Third World populations are also considered, it seems that the majority of women in the world still labour alone.

**Support from fathers and health outcomes**

The effectiveness of father support remains unclear. Some studies (7–9) have reported positive effects of father support such as increased maternal satisfaction, reduced labour pain, less medication received and fewer epidural anesthetics. In contrast other studies have not shown positive effects of father support. For instance, some studies have shown that the presence of the father during birth has no affect on his interactions with the new baby (10, 11), on perinatal interventions and on the intensity of pain experienced by women (1). Niven (12) actually reports higher levels of perceived pain during the first stage of labour in women who perceived their husbands as unhelpful.

Chalmers (5) warns against the presence of husbands who may not understand their supportive roles but who become engrossed in alternative birth room activities such as videotaping events. Such involvements may lead to added disappointments for the women who, expecting emotional support, find this is not forthcoming from their camera-ready husbands.

It appears that the presence of a supporter is not necessarily perceived as positive by the parturient and that the nature of her perception of his presence is important. As Niven (12) suggests the decision for a supporter to be present during birth is a personal one and should be made individually by each couple in terms of their knowledge of one another and of the woman's coping style.

Niven (12) points out that the contradictory findings regarding the effectiveness of father support may be due to cultural differences in obstetric practice, assessment measures used and the extent of the father's involvement in pain management techniques.
Cogan (3) and Keirse and co-workers (4) point out that most studies involving father support are methodologically flawed because families in which husbands provided labour support select themselves and may have been different in many ways from families in which husband support was not provided.

Bertsch and co-workers (6) comment further that retrospective reports of women are not reliable since the outcome of labour may bias maternal evaluations. Unfortunately this has been the most widely used method of assessing father support, and the findings must, therefore, be cautiously interpreted.

Some authors have questioned whether the support role should be handed over to fathers (2, 4, 13). Their argument is that since fathers are so subjectively involved they may harbour and transmit anxieties, demands and expectations which may contribute negatively to the course of labour and birth. It has been suggested that fathers themselves may need support and to this end labour coaches may be introduced to support the couple.

**Family and friends in the labour ward**

In response to doubts about the effectiveness of father support, some hospitals have allowed other family members or friends to accompany the labouring woman. According to Keirse and co-workers (4), only two studies have assessed this form of support. They cite the work of Davey which showed that in Melbourne, Australia, 40% of delivery units allowed other family members and friends to be present. The hospitals which did allow other support people to be present did not have lower rates of Caesarean deliveries than hospitals which did not allow support other than from the father. They also cite a Canadian study (Hodnett) which showed that 18% of women had more than one person with them during labour. Although a few said they would have wanted more supporters, 90% would have preferred to have had fewer people present than the three to six who were there. These studies suggest that the support of family and friends was not always a positive experience.

The inclusion of friends and other family members has been viewed both positively and negatively. While it may be comforting for some women to have familiar people around, it may also place pressure on the women to perform “well” and result in increased anxiety and longer labour (13).

**Medical staff support**

A few studies have assessed the effects of support given by professional medical staff. It is, however, rare for hospitals to designate staff specifically to provide support to women in labour. Support when administered by doctors or midwives, has usually been as an adjunct to other clinical responsibilities.

Keirse and co-workers (4) compared women’s ratings of support provided by professional medical staff in several retrospective surveys. The results showed that women in both home and hospital settings consistently rated their partners’ support very highly, and in most cases, more highly than that of midwives. In contrast, Garcia and co-workers (cited in ref. 4) found that women rated nurses and other staff as more reassuring than their husbands, although they felt positively about the presence of their husbands. It appears that a distinction is needed between women valuing the husband’s presence and the actual effects of husband support on outcome. It is possible that a combination of support people may yield the best effect.
The Dublin approach of “active management of labour” is associated with an impressive reduction in the duration of labour. In this system, women are provided with continuous support during labour which is regarded as a contributory factor to the reduced labour length. Staff support of this nature however is seldom available in hospitals. The support role is increasingly being handed over to people specifically introduced into hospitals to provide support for women in labour.

**Trained labour supporters**

In North America the incorporation of trained labour coaches or monitrices into labour wards is becoming popular. These are often included in labour in addition to husbands, and their role is usually defined as supporting both the labouring woman and her husband. Very few studies have assessed the role of monitrice support. Those studies which are available have consistently found positive effects of social support on health outcomes such as stress and pain in labour. Beneficial effects may occur not only at term but also in preterm labour.

The studies have often been well-designed and the resulting empirical findings are impressive. Studies involving trained support persons have generally shown more positive effects than those with fathers.

**Untrained lay supporters**

Of all the different types of labour support which have been studied, the most impressive, consistent and methodologically sound results have been obtained for support given by lay, untrained female supporters. For this reason these studies are examined here in depth.

The effect of lay support on perinatal events has been investigated in two studies. The first study was conducted at a state hospital in Guatemala City, Guatemala, where mothers routinely laboured alone. Hospital policy did not permit any family members, friends, or continuous nurse caretakers to be present, ostensibly because of the large number of deliveries (approximately 60 per day) and the limitation of space.

One hundred and three mothers were admitted to the control group and 33 to the experimental group to obtain a total of 20 in each group with uncomplicated deliveries. Subjects were randomly assigned to either an experimental or control group. The control group was treated according to hospital routine, which involved infrequent vaginal examinations to monitor the labour, auscultation of the fetal heart, and assistance during delivery. Experimental group mothers received routine care, but in addition, received constant support from an untrained lay woman from the time of admission to delivery. The experimental group received support from a woman who was not a midwife, physician or nurse. The researchers called this woman a “doula”, named after a Greek word meaning, “woman’s servant”. The support consisted of physical contact (e.g. rubbing the mother's back and holding her hands), conversation, and the presence of a friendly companion whom the mother had not met before.

The results indicated that the length of labour for the experimental group was significantly reduced. The mean time from admission to the observation ward until delivery for the 40 mother–infant pairs retained in the study was 19.3 hours for the control group and 8.7 hours.
for the experimental group. There was a decreased prevalence of overall perinatal problems from 76% (control group) to 37% (experimental group).

Results of the observations of maternal behaviour indicated that experimental group mothers remained awake for longer than the control group mothers. While the mothers were awake, there was a substantial difference in the amount of infant stroking, with experimental mothers stroking more than control mothers. Experimental group mothers talked to their infants and smiled at them more than control group mothers. The proportion of handling time, the amount of time spent in body-to-body contact, “en face”, looking at the baby or nursing, did not differ between the two groups.

The researchers concluded that their positive findings attested to the importance of human companionship during labour and delivery. Shortened labour, fewer perinatal complications and enhanced mother–infant interaction were all significantly affected by the presence of a supportive companion.

The second and larger study (17) was conducted according to the same procedure. At the same Guatemalan hospital researchers enrolled healthy primigravidous women in early labour with cervical dilatation of 3 cm or less into the study. They were randomly assigned to either a control or experimental group. The control group received constant support and companionship from one of three lay women with no obstetric training. The control group laboured alone. All subjects had a normal pregnancy and were healthy at the beginning of labour.

The results were impressive, and like the first study, showed that lay labour support rendered a positive effect on health outcome. Fewer mothers in the experimental group (27%) than in the control group (59%) developed problems during labour. Caesarean section deliveries were significantly fewer in the experimental group (7%) than the control group (19%). The use of oxytocin to augment labour was less in the experimental group (2% vs. 15%). Women with support had a mean labour length of 7.7 hours, whereas the women without support had a mean labour length of 15.5 hours. More infants of mothers in the control group were transferred to a neonatal intensive care unit than infants of mothers with social support (7% vs. 2%). The 168 women who received labour support had significantly fewer perinatal complications (34% vs. 74%) while the control group received more medication (4% vs. 19%).

An additional study, closely following the Guatemalan research examples, has recently explored the effect of providing untrained lay supporters for mothers on both birth and postpartum outcomes. While both obstetric and psychological issues were explored with regard to birthing, psychosocial issues were concentrated on in the six weeks after delivery (18, 19). This randomized control study was conducted at a community hospital (Coronation Hospital) in Johannesburg, South Africa and involved 189 nulliparous women in spontaneous labour at term with cervical dilatation of 6 cm or less on admission to the study.

Those in the study group (n=92) were attended by a lay worker with no nursing training but with basic instruction from a clinical psychologist in the provision of positive emotional support during labour. In all other respects the two groups were managed equally and according to hospital routine. Results confirmed the effectiveness of the randomization process; the supported and control groups showed no statistical differences in age, height, weight, gestation, systolic and diastolic monthly blood pressures; pulse/min; cervical dilatation; station of the fetal head; engagement in fifths above brim; and fetal heart rate in labour. Psychosocial baseline variables
also showed no differences between the groups on a measure of self-esteem or in terms of trait anxiety.

However, marked differences in psychosocial reactions to birth as measured on day one were evident between the groups. Current anxiety, assessment of pain in labour and at the time of the interview, perceived coping with labour, and the number of activities already undertaken with the baby were significantly more favourable in the supported groups (19).

At six weeks after delivery the supported mothers’ state anxiety score remained significantly lower than the control mothers, while self-esteem scores were higher.

The effect of labour support on mothers’ satisfaction with parenthood and with their babies was remarkable. Mothers who had had labour companionship had a far more positive attitude to their babies, were far more facilitative (as opposed to regulative) in their parenting style (20) and breastfed their babies more successfully (19). Their babies experienced far fewer medical problems and feeding problems. Even their relationship with their husbands or partners had improved significantly since the birth and there was a remarkable reduction in depression21.

These findings lend strong support to the hypothesis that positive support, encouragement and praise during the vulnerable period of labour and birth may have a positive effect on the mother’s feelings of value and competence, establishing a self-perpetuating cycle of confidence, competence and happiness in parenthood, and positive relationships with baby and partner.

In contrast to the Guatemalan studies, however, this study did not show any major differences between support and control group mothers in terms of the numerous obstetric measures assessed. The authors suggest this may be due to the familiarity of the hospital environment for the study mothers as well as to the optimal progress of labour that most mothers experienced.

The Coronation study findings are in agreement with reports from Sosa and co-workers (16) regarding an early study conducted in Cleveland, Ohio (22). In this study, which involved low-income, inner-city mothers, it was suggested that the effects of the supportive companion on maternal behaviour may last beyond the first hour after delivery. Mothers who were awake in the first 40 minutes of contact with their babies after birth were more affectionate, attentive, and responsive to their infants at one month after birth than were mothers who fell asleep. Sosa and co-workers (16) comment that there were some difficulties in the use of the results to argue that the presence of a supportive companion has long-term effects, since mothers who fell asleep were also more medicated. Contact between mothers in the Cleveland study was limited by hospital feeding routines to 20–30 minutes every four hours plus five hours of continuous contact each day, in contrast to almost continuous contact from birth in the Coronation Study.

Despite these methodological problems, these studies suggest that doula effects on maternal behaviour may extend beyond the actual time of delivery and require further investigation.

A comparison of father and doula support

Bertsch and co-workers (6) investigated the impact of father support during labour and delivery on 14 nulliparous subjects. They used a time-sampling method to describe the behaviours of a heterogeneous group of expectant fathers. Due to the small sample size, they did not assess labour outcomes. The type of support given by fathers was compared with support given by lay women (doulas). They found that fathers were present for 78% of the time their partners were
uncomfortable during early labour. In later labour, fathers were present for 92% of the time, but were asleep for 7% of this time. Fathers stayed closer to their partners during early labour than late labour. In late labour they exhibited less physical contact, but spent more time talking compared to early labour (38.2% vs. 14%). They suggested that this was possibly due to concern that touch might increase the mother’s discomfort. During late labour the predominant form of speech was of a comforting nature. Instructive verbalizations comprised the smallest component of fathers’ speech during both early and late labour while mothers were uncomfortable.

In a different study cited by Bertsch and co-workers (6), De Lay and colleagues examined the behaviour of three lay supporters (doulas) with 13 nulliparous women. They found differences between doulas and fathers in all categories of supportive behaviours except hand holding. Doulas were significantly closer to mothers during contractions than were fathers in both early and late labour.

Doulas spent a significantly greater percentage of time talking to mothers in both early (doulas 45.8% vs. fathers 14.0%) and later stages of labour (doulas 57.7% vs. fathers 38.3%). Doulas also spent more time than fathers rubbing, stroking, clutching and holding mothers during early and later labour. Unlike fathers, doulas were present for 100% of the time during early and late labour. In a retrospective postpartum questionnaire, Bertsch and co-workers (6) found that of the ten mothers who responded, 40% felt that their partners had done much better than expected, 50% as expected and 10% worse than expected. All mothers rated their partners as “terrifically helpful”, 70% thought that their partners had touched them “at just the right moment” (p. 256). Ninety percent of mothers concluded that the father's presence increased the meaning of the labour and delivery experience, and all mothers and fathers felt that the shared experience had strengthened their relationship. It is also interesting to note that 63% of the eight fathers who responded to the postpartum questionnaire felt that their role during labour had been different from what they had expected. Seventy-five percent thought their behaviours during labour and delivery were helpful to their partners.

Despite the range of different behaviours among fathers, maternal satisfaction with fathers’ behaviour was high. Bertsch and co-workers (6) state that this is consistent with other findings.

They point out that the difference between father and doula behaviour is “striking”. They comment that doulas are also different from fathers in that they have experience with labour progress and pain, have support for the labouring woman as their only commitment, and have a secure role in the hospital hierarchy. Although doulas have only a temporary emotional involvement with the mother, 100% of the women supported by doulas rated them as “the best thing” about their labour and birth experiences. In support of this finding, the Coronation study mothers expressed a preference for “doulas” as supportive companions for future births as opposed to husbands (23).

It appears from a number of studies (6) that the fathers’ presence in labour is of great importance despite findings that show no effect on outcome, uncertainty of staff and concern about the role of fathers in the delivery ward, and fathers’ anxiety about the mother and baby.

Bertsch and co-workers (6) conclude that mothers in the United States consistently report that support during labour (whether from a doula or male partner), renders a positive emotional impact. Four out of five women in the United States are accompanied by husbands during delivery. They point out that this is in contrast to the practice in almost all cultures of the world as researched by Murdock and White (24), where women are supported by other women. It is,
however, not known whether the male partner as supporter will have the same effect on obstetric and/or psychosocial outcome as that of the doula.

**Implications of the Guatemalan and Coronation results**

Many researchers in the field of labour and social support have commented on the sound methodology and important implications of the Guatemalan results (1, 3, 4, 25–27).

Cogan (3) states that the studies are of special significance because they were randomized and prospective, thereby making it possible to isolate the effects of labour support from other effects. She also points out that although the studies demonstrated positive effects, it must be remembered that complete isolation of the labouring woman from family members is unusual in most contemporary labour settings. This latter point can be debated as only being applicable to First World women.

Kennell and co-workers (2) comment that the findings of the study (i.e. that continuous social support resulted in a shorter labour and a healthier mother and baby) may enhance understanding of the normal birth process by observing common behaviours in non-industrialized societies. Although women can labour alone, this may be at major cost to women due to the present arrangements in some hospitals.

Sosa and colleagues (16) suggest that doula support may be particularly relevant for care of low-income, single, or teenage mothers who may not have received positive support from their families during labour and who may have no educational or cultural preparation for childbirth. False labours and dramatic deceleration of labour on entering hospital may result from mothers’ reactions to the strange, inhibiting or frightening aspects of the hospital environment.

Kennell and co-workers (2) question whether the father or other family members are adequately prepared to fill the role of the doula. They note that casual observations in delivery units show that while some fathers provide excellent support, others may not arrive at all, or leave early. They suggest that even well-prepared fathers may find the strain too great. However, they also point out that the father’s role should not be minimized, since mothers have indicated the value of his presence. Chalmers (5) warns against the father’s new role in the delivery room as that of a photographer rather than birth companion. A possible resulting lack of support compounded by disappointment at this deficit as compared to prior expectations of the father’s role may be deleterious for the mothers at least.

Kennell and co-workers (2) point out that in some situations a doula has supported the couple during labour and the experience of this suggests that the doula’s support of the father may enhance his ability to be more supportive to his wife. They cite an unpublished study in the United States, which showed that in the 125 deliveries during which the father or another family member was present, enthusiasm about the doula’s role was consistently great. They suggest that further research be conducted to establish how a doula can work best with a couple. They also discuss the role of the doula in the postpartum period. They point out that many doulas have a longer period of association with the mother than in the published research. Doulas in the United States (but not in the Coronation study) often provided support for mothers in the early postpartum period or even for a few months after birth. This support may involve helping mothers to relate to their babies and establishing breastfeeding in hospital and at home. They point out that this is more like the practice in non-industrialized countries, where close family
members or friends also provide support for the mother and baby in the first days, weeks or months.

Kennell and co-workers (2) conclude that the use of a doula is a low-cost intervention that may be a simple way to reduce the length of labour, the number of Caesarean sections and the occurrence of a number of perinatal problems. They also alert proponents to the problem that the doula may be regarded as less important than medical interventions, and may not be, provided for every mother in all hospitals as they advocate should happen. “A constant companion during labour should be just as strong an imperative or requirement in industrialized nations as it is for the Mayan Indians of the Yucatan” (p. 198). The Coronation study suggests that while obstetric outcome may not always be open to improvement, psychosocial benefits of support remain.

Keirse and co-workers (4) have commented extensively on the Guatemalan studies. They note that if a stress-inducing environment during labour can have negative effects, then the perinatal outcomes of the studies may have a major iatrogenic component. The stressful setting with 60 deliveries a day, an open observation ward for early labour and hospital policies which did not permit any family member, friend or nurse to be continuously present might well have induced fear and anxiety.

Some important considerations with regard to the studies have been raised by Keirse and co-workers (4). These concern firstly, the mechanisms of action, and secondly, the generalization of the results. They state that it is worthwhile considering the reasons for better outcomes because they have implications for generalization to other settings. For example, the unique characteristics of the doulas and the sociocultural background of the women in the samples may have been important in rendering positive outcomes. Several studies (16, 17, 28) have also suggested that there may be a link between maternal anxiety, catecholamines and labour outcome. In contrast, however, findings from the Coronation study fail to support this hypothesis.

Keirse and co-workers (4) suggest another mechanism which may be related to the adverse effects of the birth environment in the Guatemalan hospital. This is that the women in the Guatemala study would have been the first to labour alone and give birth among strangers and in the presence of men. The routines in the hospital were based on North American practices of the 1950s. By contrast, birth in Guatemala until that time had been carried out at home, with the mother’s mother, the father’s mother and a village midwife assisting. They point out that the women, the doulas and the nurses were similar in background, ethnicity and language. Given this information and the overcrowded and hectic labour wards, it seems possible that the environment might have been particularly stressful. This hypothesis is supported by the Coronation study findings where obstetric outcome was not affected by support. In this study, women laboured in a familiar hospital in their own community setting.

Keirse and co-workers (4) question the ability to generalize of the results. Firstly, because of the special features of the environment, and in part because of the special characteristics of the doulas, which are unlikely to be reflected in other categories of support persons such as partners, midwives and others. According to their personal correspondence with Kennell, the doulas were single and childless, highly trained research workers and had obtained advanced training and degrees before joining the support project. All three were similar to the patients in ethnicity, culture and language, but they were better educated. In contrast, however, the doulas in the Coronation study were similar to patients in all respects, including education and training backgrounds.
Since the Guatemalan and Coronation studies have yielded impressive results and followed most sound research procedures (controlled, randomized and prospective designs) doula support clearly needs to be considered for inclusion in contemporary labour wards. Further research along the same lines is needed to establish the generalization of these results.

**Conclusions**

It is clear that the field of labour support at present is peppered with many more questions than answers. More research is needed to establish who benefits most from which type of support. Cross-cultural differences regarding the experience of support also need examination.

Along with this, researchers need to examine the expectations that women harbour about the support they will have and need. In addition, the mechanisms by which support operates need to be understood.

Researchers have also raised the question of which types of support are most beneficial to women, since there appear to be multiple variations in the type of support and the sources of this support. Keirse and co-workers (4) mention some of the types of support. These include physical comfort, encouragement and explanation and advocacy (which may involve plans and expectations before labour). Cogan and Spinnato (1) also point out that labour support has been composed of tangible or instrumental support, which has included such things as information about labour, support for relaxation and breathing and emotional support. A single supporter may provide some or all of the spectrum of support functions or more than one supporter may be included to fulfil different needs of the mother. Alternatively, simply being present but not active in the labour environment may be supportive, as suggested by Odent (personal communication) and supported by Kennell and co-workers (28).

Keirse and colleagues (4) go so far as to conclude that where there are extremes of isolation, overcrowding, use of painful interventions, changing professional staff, and no support person, especially for primigravidae, the provision of a friend companion chosen by the labouring woman is likely to improve her wellbeing. Where women have strong preferences for who should be with them, even if in contrast to professional preference, this need must be accommodated.

Even if a variety of different types of support are shown to be consistently helpful in scientifically sound studies, the issue of each woman's personal choice as to whom, when and how much support she wants must be upheld, even if that choice is to have no supporter at all.

Health professionals are further cautioned from assuming that favourable First World conditions apply to all women who deliver in hospitals or clinics. There are many facilities which are overcrowded, understaffed and underequipped, where mothers labour in relative isolation. Consideration of allowing companionship in labour in such settings should have priority.

All researchers in the field of labour support have called for future research. The generalization of previous findings needs to be established, and a number of questions require answers. What is important in providing effective support? Is it enough to be there, or is it necessary to provide encouragement or physical comfort? What is the relationship between supporters and care givers? Is it better for the person to be a stranger than to be familiar, to be a peer or a professional (4)? What traditional cultural patterns influence the “ideal” role to be played by the supporters (29)?
The labour support studies which have been conducted thus far have primarily assessed health outcomes according to medical and physiological criteria. The exceptions to this have been Sosa and co-workers (16) and the Coronation study which also examined doula effects on maternal–infant interactions with positive results. Since labour support is essentially a psychosocial intervention, it seems a strange contradiction that psychosocial effects have not been assessed. A multidimensional approach including medical, psychological and social variables is needed for a complete understanding of the concept of labour support.

References


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Module 10. Reading  
Summary: Food for thought – should women fast or feed in labour

The nature, validity and logic of the scientific basis for denying women food and drink during labour is examined.

Lewis explores the widespread practice of women fasting in labour and looks at the wider issues which affect the practice of midwives – issues such as the supposed “superiority” of science, the normality of the process of labour and the power of the obstetrician. The idea that obstetric practice is based on scientific evidence may be somewhat naive. Midwives are considered to be expert in the “normal”, and the obstetrician to be expert in the “abnormal”. But it appears that the obstetrician decides what is normal or abnormal. Obstetricians therefore view pregnancy and childbirth as normal only in retrospect and as processes requiring management and control in much the same way as a disease might do. The care that women receive is therefore frequently based upon a medical model. Lewis explores why doctors advocate – and midwives condone – women fasting in labour.

Fasting in labour originated in 1946 when Mendelson published an account of the deaths of 66 women (out of 44,016) undergoing obstetric anaesthesia who aspirated stomach contents into their lungs. However, it was found that in only 45 of the cases was death directly attributed to aspiration, and of these 40 aspirated fluid and only five aspirated solids, suggesting that fluids were more dangerous than solids. Subsequent studies differed somewhat.

Obstetricians have been convinced that delayed gastric emptying, reduced oesophageal tone and increased abdominal pressure in labour increases the risk of aspiration of the stomach contents.

The obstetrician justifies the withholding of food and drink on the grounds that the risk of death of a previously healthy woman through inhalation of stomach contents justifies radical preventive action. The fear of litigation adds further pressure. But does this practice truly benefit women?

Since it is impossible to predict accurately all those women who will need a general anaesthetic in labour, it could be argued that fasting on the part of all women is justified. Yet acid aspiration syndrome still occurs, as shown by the Confidential enquiries into maternal deaths in England and Wales, which is published every three years. A potential contributing factor is the fact that after fasting the pH of the gastric contents is reduced (the acidity is higher) and the risk of death is therefore greater if aspiration does occur. Antacids have not proved effective in raising the pH of gastric contents. However, when food is ingested the pH rises.

Nimmo et al. have shown that in early labour gastric emptying is normal, and that it is only slightly delayed even in advanced labour. When opiate analgesia is given, however, gastric emptying is markedly delayed.

It would appear the present policy of women fasting in labour is not as sound as we have been led to believe. In fact, it may be detrimental to the women and fetus. It may also be that restricting food against a woman’s wishes increases the stress of labour, increasing her perception of pain, lowering her morale and resulting in inefficient uterine action. This may lead to unnecessary interventions.
Module 10. Reading
Maternity Care in Canada, the United States and St Petersburg (1993–1997)

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MODULE 11.
THE USE OF THE PARTOGRAPH
(ALSO KNOWN AS PARTOGRAM)

At the end of this module participants should be able to use the partograph to monitor progress in labour.

A blank partograph is attached as Appendix 1 to this module for use as required by teacher and students.

EXERCISE
Define poor progress in labour. Participants will see how difficult it is to come to a consensus view, or indeed one which can readily translate into logical action.

Introduction to the partograph

The partograph is probably the simplest and yet the most effective aid to logical management of labour that has ever been devised. The idea of a graphical representation of the progress of a labour seems obvious to us now, yet it was not until the 1960s that it began to be used in obstetric practice.

The underlying principles of the partograph are that:

- it is a method of displaying progress in cervical dilatation as a continuous graph, while at the same time;
- displaying as many other features of the state of the mother, the fetus and the labour as possible in graphic form.

It is this combination of features which makes the partograph so valuable. This value is apparent for all health workers from the least to the most experienced, and for all health care environments from the least to the most sophisticated.

When discussing the partograph, therefore, it is important to stress that it is not simply a record of cervical dilatation, although that is clearly a most important part of the record. When a health care worker reads a properly filled-in partograph he or she will gain an insight into the labour from onset to the present moment that would require a considerable number of words to describe. Experienced maternity care givers know that handwritten descriptions of labour are less and less efficient sources of information the longer they or the labour become. Apart from anything else nobody has the time (or the inclination) to read through pages of not infrequently illegible writing. By contrast, a partograph can be assimilated very quickly. It could be argued that a properly filled-in partograph should replace all other written notes in a labour.

Items recorded on the partograph

The following details are recorded on a partograph:

- the patient:
  - name
  - obstetric details (parity, gravidity)
– registration number
– date of admission
– time of admission
– time of ruptured membranes.

• the fetus:
  – heart rate
  – liquor: clear (C), blood-stained (B), meconium-stained (M) or intact (I)
  – cervix: dilatation in cms, plotted with an X
  – descent: of the leading surface of the fetal head, expressed in fifths palpable per abdomen, plotted with an O and established by abdominal palpation, performed at each and every vaginal examination.

• contractions:
  – frequency (expressed as number of contractions in 10 minutes)
  – strength (expressed by intensity of shading).

• oxytocin:
  – dosage can be recorded for each hourly period.

• drugs and intravenous fluids:
  – free space for details.

• blood pressure, pulse and temperature:
  – blood pressure and pulse – hourly or more frequently recommended
  – temperature – 3–4 hourly recommended.

• urine:
  – quantity
  – analysis (blood, protein and acetone)
  – recorded after each time urine is passed.

The first recording of cervical dilatation in active labour is plotted on the appropriate position on the Alert line. Ideally labour should then proceed along the Alert line. If labour is progressing more slowly than this the plot of dilatation against time will tend to move toward the Action line. The Action line on the WHO partograph (there are several different designs of partograph) is four hours to the right of the Alert line. Once the plot has crossed the Action line it becomes appropriate to consider action.

How often should observations be performed on mothers and fetuses? There is no absolutely right answer to this. However, it has been found that in many countries the frequency of observations is decidedly low.

More important than the frequency of observations is the way in which the observations are made. It can be seen from the partograph that the timing of fetal heart auscultation will massively
influence whether the observation is a true or a false reflection of the fetal heart rate pattern. The (very brief) introduction to fetal heart rate patterns is designed to illustrate this. A very important message is that continuous electronic fetal heart rate monitoring is now agreed to be unnecessary and potentially disadvantageous in normal labours. Intermittent auscultation is perfectly acceptable and preferable.

It should be stressed that the aim of the partograph is to construct a total picture of the state of the mother and baby, hence the numerous observations made.

Clearly, the most important part of the partograph is the observation of cervical dilatation with time, coupled with the descent of the presenting part (normally the head) of the fetus within the maternal pelvis. (It is important to emphasize that no vaginal examination in labour is complete without observation of the position of the presenting part. It must be emphasized that many mistakes in management of labour are made by failing to observe this feature.)

**The nature and importance of the Action and Alert lines**

The Action and Alert lines are crucially important. The Alert line is the point beyond which progress in cervical dilatation has fallen behind the “desirable” rate of 1 cm per hour. Notice is taken but no action is required. The Action line, by contrast, is the line beyond which action is considered to be required to restore progress to an acceptable level.

The value of these lines lies in the fact that they allow professionals to recognize poor labour function earlier than would be the case if a verbal (as opposed to a graphic) description only were used. They also help to achieve uniformity within and between maternity units.

The WHO partograph has not included differences between nulliparous and multiparous women. This is somewhat artificial since it is well recognized that multiparous labours are faster, but in the interests of simplicity (and therefore a lower risk of confusion) a single partograph has much to recommend it.

The issue of the latent phase of labour (contractions/labour at 3 cm dilatation or less without cervical progress) is a difficult one. The partograph recognizes it and allows for it, but it is not at all clear what the solution is for a prolonged latent phase. This is one of many unanswered questions in labour management.

How often should vaginal examinations be performed? This is a frequently asked question. The partograph effectively answers that for us. If we accept that it is desirable not to cross the Action line, the next vaginal examination is due **no later than the time at which the Action line would be crossed if no change has occurred in cervical dilatation**. Therefore, if the current examination places the woman on the Alert line, the next examination is due in four hours (unless, of course, it is indicated earlier for some clinical reason). If progress has been poor before the current examination, and if the point on the graph lies between the Alert and the Action lines, the next vaginal examination will clearly be due earlier.

What is the value of filling in the partograph fully? One simple example is the rapid differentiation between different types of poor cervical progress. Clearly poor progress in the presence of feeble contractions will probably have very different implications from that in the presence of very strong contractions. This will be instantaneously apparent on the partograph. Also the implication of meconium staining is well known and this too can be immediately
appreciated, as can the time of recognition of meconium passage. There are countless other simple illustrations of the benefit of filling in the partograph properly.

WHO has introduced a partograph which has been the subject of research in many countries. The design is the same in all countries. Local modifications can be introduced to fit in with local practices, but the basic design is a good one which we strongly recommend.

It should be made clear that these are guidelines and not rules. The partograph is meant to be our servant and not our master. However, once a maternity department has agreed how it intends to use the partograph, the management of labour will naturally become much more logical.

**How to use the partograph**

**Sources**
The following material is adapted from: “How to use a partograph when monitoring labour progress”, from *Life-saving skills manual for midwives*, 2nd ed. Washington DC, American College of Nurse-Midwives, 1991.

WHO slides and presentation notes on the partograph (WHO/MCH/90.2) can also be used in conjunction with *Preventing prolonged labour: a practical guide, the partograph, Part I: Principles and strategy* (WHO/FHE/MSM/93.8), *Part II: User’s manual* (WHO/FHE/MSM/93.9) and *Part III: Facilitator’s guide* (WHO/FHE/MSM/93.10). The partograph documents and slides are available from the Maternal Health and Safe Motherhood Programme, Family and Reproductive Health, World Health Organization, 1211 Geneva, Switzerland.

**Introducing the partograph**
The partograph is a record of all of the observations made on a woman in labour, the central feature of which is the graphic recording of the dilatation of the cervix as assessed by vaginal examination (Figure 11.1). The following is a guide to the partograph.

**Patient information**
The patient’s name, gravida, para, registration/hospital number, date and time of admission and time of ruptured membranes are written at the top.

**Fetal heart rate**
This is recorded to monitor the condition of the fetus.

**Liquor**
Amniotic fluid is observed and recorded as clear (“C”), blood-stained (“B”) or meconium-stained (“M”). If the membranes are not ruptured, record “I” for intact.

**Moulding**
This is recorded as follows: bones are separated and the sutures can be felt easily (o); bones are just touching each other (+); bones are overlapping (++); bones are overlapping severely (+++).

**Cervical dilatation**
This is the most important observation to monitor progress of labour. The dilatation is plotted with an “X”. The latent phase, active phase, Alert and Action lines will be explained in detail in the following pages.

**Descent of the head**
This is very important in the monitoring of the progress of labour. The descent is plotted with an “O”.

**Time**
This is recorded using the time of admission as zero time. The actual time of day is recorded below the hours line.
**Contractions**
Along with cervical dilatation and descent of the head, contractions tell the progress of labour. The contractions are recorded under the time line.

**Oxytocin, drugs and intravenous fluids**
The amount is recorded in the space provided.

**Blood pressure, pulse and temperature**
The amount is recorded in the space provided.

**Urine**
The amount is recorded every time urine is passed. Albumin and acetone (ketone) are tested if the materials for testing are available.
Module 11. The Use of the Partogram

Figure 11.1

PARTOGRAPH

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<th>Name</th>
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</tr>
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<td>Liquor Moulding</td>
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<td>Oxytocin U/L, drops/min</td>
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<td>Drugs given and IV fluids</td>
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<td>Pulse and BP</td>
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<td>Temp °C</td>
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</tr>
<tr>
<td>Urine</td>
<td>protein acetone volume</td>
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</table>
When a woman is admitted in labour a complete evaluation of her condition and the condition of her baby is done. This includes a history, physical and pelvic examination. The following information will help you learn how to record, observe and interpret your findings using the partograph.

**Progress of labour**

**Cervical dilatation**

The first stage of labour is divided into the *latent* and *active* phases.

The *latent* phase (slow period of cervical dilatation) is from 0–2 cm with gradual shortening of the cervix.

The *active* phase (faster period of cervical dilatation) is from 3–10 cm.

Look at Figure 11.2. Along the left side are the numbers 0–10. Each number/square represents 1 cm dilatation.

**Figure 11.2**

Along the bottom of the graph are 24 squares. Each square represents one hour.

The dilatation of the cervix is recorded with an X. Look at Figure 11.2 to see the dilatation of the cervix recorded. The first vaginal examination, on admission, is recorded. Vaginal examinations are carried out at least every four hours. Women (particularly multipara women) may need to be checked more frequently in advanced labour.
**EXERCISE 1:**

**Plotting cervical dilatation when the labour is in the active phase on admission**

Look at Figure 11.3.

In the section marked active phase there is an alert line – a straight line from 3–10 cm.

When a woman is admitted in the active phase, the dilatation of the cervix is plotted on the alert line at the place equal to her dilatation, and the clock time written directly under the X in the space for time.

![Figure 11.3](image)

If progress is satisfactory, the plotting of cervical dilatation will remain on or to the left of the alert line.

Record the following on the graph:
- The time of admission was 15:00, dilatation of the cervix 4 cm.
- At 17:00, dilatation was 10 cm.

How long was the first stage of labour at the maternity?
ANSWERS TO EXERCISE 1:

- Dilatation of the cervix was 4 cm, the active phase.
- Dilatation is plotted on the alert line at 4 cm.
- The time of admission was 15:00.
- At 17:00, dilatation was 10 cm.
- Time in the first stage of labour after admission was 2 hours.

Continue to Exercise 2.
EXERCISE 2:

Plotting cervical dilatation when admitted in the latent phase

The latent phase normally may take 8 hours.

When admission is in the latent phase, dilatation of the cervix is plotted on the line marked zero (Figure 11.5).

Vaginal examination is carried out every 4 hours, if the woman has contractions. If the membranes have ruptured and the woman has no contractions, a very careful vaginal examination is carried out upon admission to determine cervical dilatation, position of the head and to make sure the cord is not prolapsing.

Find the following in Figure 11.5:

- Admission was at 9:00 and the cervix was 1 cm dilated.
- At 13:00, the cervix was 2 cm dilated.
- At 17:00, the cervix was 3 cm dilated when she entered the active phase of labour.
- At 20:00, the cervix was 10 cm.

How many hours was the latent phase of labour?

How many hours was the active phase of labour?
ANSWERS TO EXERCISE 2:

- The latent phase of labour began at admission (9:00) and the cervix was 1 cm dilated. The latent phase of labour ended at 17:00 when the cervix was 3 cm dilated. The latent phase lasted 8 hours.

- The active phase began at 17:00 when the cervix was 3 cm dilated and ended at 20:00 when the cervix was fully dilated. The active phase lasted 3 hours.

Continue with Exercise 3.
EXERCISE 3:

Plotting cervical dilatation from latent to active phase

When dilatation is 0–3 cm, plotting must be in the latent phase area of the graph (Figure 11.6). When labour goes into the active phase, plotting must be moved by a broken line to the alert line.

Figure 11.6

Note: TR = transfer of plotted point from the latent phase onto the alert line.

Look at the following information in Figure 11.6.

- Admission time was 14:00 and the dilatation was 2 cm.
- At 18:00 the dilatation was 6 cm – active phase.

Move the time and dilatation from latent to active phase on the alert line. Remember to use a dotted line for the move.

- At 22:00 the cervix was 10 cm.

How many vaginal examinations were performed?

How long was the first stage of labour at the maternity?
ANSWERS TO EXERCISE 3:

- Three vaginal examinations were performed at 14:00, 18:00 and 22:00.
- First stage of labour was 8 hours, beginning at 14:00 and ending at 22:00.

POINTS TO REMEMBER:

The latent phase is from 0–3 cm dilatation and is accompanied by gradual shortening and thinning (effacement) of the cervix. It should normally not last longer than 8 hours.

The active phase is from 3–10 cm dilatation which should be at the rate of at least 1 cm/hour.

When labour progresses well, the dilatation should not cross to the right of the alert line.

When admission takes place in the active phase, the admission dilatation is immediately plotted on the alert line.

When labour goes from latent to active phase, plotting of the dilatation is immediately moved from the latent phase area to the active phase area on the alert line.

Descent of the fetal head

For labour to progress well dilatation of the cervix should be accompanied by descent of the head.

For convenience, the width of the five fingers is a guide to the expression in fifths of the head above the brim. A head which is mobile above the brim will accommodate the full width of five fingers (closed) (Figure 11.7 top).

As the head descends, the portion of the head remaining above the brim, will be represented by fewer fingers (4/5th, 3/5th, etc.). It is generally accepted that the head is engaged when the portion above the brim is represented by two fingers’ width or less (Figure 11.7 bottom).

Descent of the head should always be assessed by abdominal examination immediately before doing a vaginal examination so that you will know where to expect to feel the head during the vaginal examination.
Figure 11.7

Head is mobile above brim = 5/5

Head accommodates full width of five fingers above the brim

Head is engaged = 2/5

Head accommodates two fingers above the brim
EXERCISE 4:

To plot descent of the head, on the left side of the graph (Figure 11.8) see the word “descent” with lines going from 5–0. Descent is plotted with a 0 on the graph.

Record the following on the graph:

- On admission at 13:00, the head is 5/5 (five fifths) above the pelvic brim and the cervix is 1 cm dilated.
- After 4 hours, the head is 4/5 (four fifths) above the brim and the cervix is 5 cm dilated.
- Labour is now in the active phase. Cervical dilatation, descent of head and time recordings are transferred to the alert line.
- After three hours, the head is 1/5 (one fifth) above the pelvic brim and the cervix is 10 cm dilated.
- How long was the first stage of labour in the maternity?
ANSWERS TO EXERCISE 4:

Figure 11.9

- On admission at 13:00, the head is 5/5 (five fifths) above the pelvic brim and the cervix is 1 cm dilated.
- After four hours, the head is 4/5 (four fifths) above the brim and the cervix is 5 cm dilated. Labour is now in the active phase. Cervical dilatation, descent of the head and time recordings are moved to the active phase.
- After three hours, the head is 1/5 (one fifth) above the pelvic brim and the cervix is 10 cm dilated.
- The first stage of labour in the maternity was seven hours.

POINTS TO REMEMBER:
Measuring descent of the baby’s head helps the midwife follow the progress of labour.
An abdominal examination must always be done before a vaginal examination.
**Uterine contractions**
Good uterine contractions are necessary for progress of labour. Normally contractions become more frequent and last longer as labour progresses.

**Recording on the partograph**
Below the time line and at the left hand side is written “contractions per 10 mins”.

Squares are numbered from 1–5. Each square represents one contraction so that if two contractions are felt in ten minutes, two squares will be shaded.

The squares below show the key to the three ways the strength of contractions are recorded on the partograph.

- Dots represent mild contractions of less than 20 seconds’ duration.
- Diagonal lines indicate moderate contractions of 20–40 seconds’ duration.
- Solid colour represents strong contractions of longer than 40 seconds.

In the **latent phase**, contractions must be one or more in 10 minutes, each lasting 20 seconds or more. In the **active phase**, contractions must be two or more in ten minutes, each lasting 20 seconds or more.
EXERCISE 5:

Plotting contractions on a partograph

Find the following on Figure 11.11:

- The woman was admitted at 14:00 in the active phase of labour.
- The cervix was 3 cm dilated, the head was 4/5 (four fifths) above the pelvic brim.
- Contractions were two in ten minutes, each lasting 20–40 seconds.
- At 18:00 the cervix was 7 cm dilated, the head 3/5 (three fifths) and contractions were four in ten minutes, lasting between 20–40 seconds.
- At 21:00 the cervix was 10 cm, the head 0/5 (no fifths), contractions were five in ten minutes, lasting over 40 seconds.

POINTS TO REMEMBER:

Contractions are observed for frequency and duration.
The number of contractions in 10 minutes is recorded.
The three ways of recording the duration of contractions are: under 20 seconds, 20–40 seconds, over 40 seconds.
Record contractions below the correct time on the partograph.
**Condition of the fetus**

Fetal heart rate, membranes, liquor (amniotic fluid) and moulding of the fetal skull bones give information about how the baby is doing during the labour.

**Fetal heart rate**

Listening to and recording the fetal heart rate is a safe and reliable way of knowing that the fetus is well.

The fetal heart rate is recorded at the top of the partograph, Figure 11.12. It is recorded every half hour. Each square represents 30 minutes. The lines for 120 and 160 beats per minute are darker to remind the midwife that these are the normal limits of the fetal heart rate.

![Figure 11.12](image-url)
Membranes and liquor (amniotic fluid)
The state of the liquor or amniotic fluid can assist in assessing the fetal condition.

The following observations are recorded on the partograph immediately below the fetal heart rate recordings, Figure 11.13. The observations are made at each vaginal examination. They are:

If the membranes are intact:
Record as the letter “I” for “intact”.

If the membranes are ruptured and the liquor is:
- clear, record as the letter “C” for “clear”
- blood-stained, record as the letter “B”
- meconium-stained, record as the letter “M”
- absent, record as the letter “A” for “absent”.

Listen to the fetal heart rate every five minutes if the liquor:
- has thick green or black meconium
- is absent at the time membranes rupture.

These may be signs of fetal distress (baby is in trouble).
Moulding of the fetal skull bones
Moulding is an important finding as to how well the pelvis will accommodate the fetal head. Record the moulding, look at Figure 11.14, using the following key:

- bones are separated and the sutures can be felt easily
- bones are just touching each other
- bones are overlapping but can be separated easily with pressure from your finger, refer
- bones are overlapping but cannot be separated easily with pressure from your finger, refer

Figure 11.14

- Listen to the fetal heart rate immediately after the strongest part of a contraction with the woman lying on her back.
- Recordings of the fetal heart rate are made every half hour in the first stage of normal labour.
- Normally the fetal heart rate is between 120–160 beats/minute.
- Increasing moulding with a high head is a sign of disproportion (baby is too big for mother’s pelvis), refer immediately.

Condition of the mother
All the observations for the condition of the mother are written at the bottom of the partograph. Look at the partograph in Figure 11.15.

Pulse, blood pressure and temperature
Take the pulse every half hour.
**Urine**
Ask the mother to pass urine every 2–4 hours. Look at the urine for amount and concentration. The protein and acetone should be tested in hospital and at maternities, if possible.

**Drugs and rehydration fluids**
Chart these when you give them.

**Oxytocin**
There is a separate column for oxytocin above the column for rehydration fluids and drugs.

All entries are made on the time line at which the observations are made.

![Figure 11.15](image-url)
EXERCISE 6:

Look at the completed partograph of a normal first stage of labour (Figure 11.16). Answer these questions.

1. What was the fetal heart rate on admission?
   What was the fetal heart rate at 13:00?
2. When did the membranes rupture?
   What was the condition of the liquor?
3. How much moulding of the fetal head was recorded?
4. What was the dilatation of the cervix on admission?
   What was the station of the head?
5. What was the dilatation of the cervix when the labour transferred from latent to active phase?
6. Describe the contractions at 9:00.
7. List the vital signs on admission.
8. What was the length of labour from admission to full dilatation?

ANSWERS TO EXERCISE 6:

1. 120–130, 120–130.
2. 3:00, two hours before admission. Clear.
3. No moulding was recorded.
4. 2 cm, 4/5.
5. 5 cm.
6. Four contractions in ten minutes, strong lasting over 40 seconds.
7. B/P 110/70, P 80, T 36.8.
8. Eight hours.

POINTS TO REMEMBER:

Time of admission is zero time, when the woman comes in the latent phase of labour.
When the active phase of labour begins all recordings are transferred, plotting the cervical dilatation on the alert line.
When progress of labour is normal, plotting of the cervical dilatation remains on the alert line or to the left of the alert line.
Module 11. The Use of the Partogram

Figure 11.16

PARTOGRAPH

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<th>Name</th>
<th>Mrs B.</th>
<th>Gravida</th>
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<td>Ruptured membranes</td>
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</tr>
</tbody>
</table>

- **Fetal heart rate**: 120-150 beats per minute
- **Liquor Molding**: O O O O O O
- **Cervix (cm) [Plot X]**: Full dilation
- **Descant of head [Plot G]**: Engaged
- **Uterine contractions per 10 mins**: 5
- **Oxytocin U/L drops/min**: None
- **Urine**: Protein - - - - - -
- **Urine volume**: 500 100 100 60

**Note**: SVD of live female infant at 10:30 on 27.3.1988, wt 2850 g.
Abnormal labour progress
The midwife or doctor can use the partograph to identify complications in labour. When the labour is not normal, the midwife must help the woman to get to someone more skilled who can decide the outcome of a delivery; Caesarean section, oxytocin drip, analgesia, rehydration, forceps or vacuum extraction may be necessary to save the mother and her baby.

Prolonged latent phase
When a woman is admitted in labour in the latent phase (less than 3 cm dilated) and remains in the latent phase for the next eight hours, progress is not normal. She must be transferred to a hospital for further care.

The heavy line drawn on the partograph at the end of eight hours of the latent phase means that the woman needs to be referred to a facility where more skilled help is available (Caesarean section, forceps or vacuum extraction etc).

EXERCISE 7:

Prolonged latent phase
Fill in the following information, using the graph in Figure 11.17.

- On admission at 7:00 the head was ...................... and the cervix was ......................
- There were .................. contractions in ten minutes, lasting ......................
- After four hours, at 11:00, the head was ................ and the cervix was ................
- In the last ten minutes of that half-hour, there were .......... contractions lasting ...........
- Four hours later at 15:00, the head was still ............... and the cervix was still ............
- Contractions were ...................... in ten minutes lasting ......................
- The length of the latent phase was ..........................................................
ANSWERS TO EXERCISE 7:

- On admission at 7:00, the head was 5/5 and the cervix was 1 cm dilated. There were two contractions in ten minutes, lasting 20–40 seconds.

- After four hours, at 11:00, the head was 4/5 and the cervix was 2 cm dilated. In the last ten minutes of that half-hour, there were two contractions lasting 20–40 seconds.

- Four hours later at 15:00, the head was still 4/5 and the cervix was still 2 cm dilated. Contractions were three in ten minutes lasting 20–40 seconds.

- The length of the latent phase was eight hours and not completed. Referral must be immediate in order to allow for a doctor to make a decision on how to assist the woman in labour.

Moving to the right of the alert line
In the active phase of labour, plotting of the cervical dilatation will normally remain on, or to the left of the alert line. When dilatation crosses to the right of the alert line, this is a warning that labour may be prolonged.

When the dilatation moves to the right of the alert line, the mother must be transferred to a hospital, unless she is very near to delivering.

At the action line
The action line is four hours to the right of the alert line. If a woman’s labour reaches this line, a decision must be made about the cause of the slow progress and action taken. The decision as to what action should be taken to assist the labour must be made with a doctor, usually in the hospital.
EXERCISE 8:

Exercise 8 will demonstrate the importance of the alert and action lines. Look carefully at Figure 11.18 and answer the questions.

Figure 11.18

- At 8:00 the cervix is ...... dilated on the alert line. The woman may remain in the maternity.
- At 12:00 noon, the cervix is ...... dilated, moving to the right of the alert line. The woman must be transferred.
- At 16:00 the cervix is ...... dilated, at the action line.

A decision must be made by a skilled person as to what action needs to be taken at the hospital.

ANSWERS TO EXERCISE 8:

- At 8:00 the cervix is 3 cm dilated on the alert line. The woman may remain in the maternity.
- At 12:00 noon, the cervix is 6 cm dilated, moving to the right of the alert line. The woman must be transferred to the hospital under the care of a doctor.
- At 16:00 the cervix is 7 cm dilated, at the action line. A decision must be made about what action needs to be taken at the hospital.

POINTS TO REMEMBER:

All women whose cervical dilatation moves to the right of the alert line must be transferred to hospital, unless delivery is near.
At the action line, the woman must be re-assessed for lack of progress. A decision must be made on what action needs to be taken.
EXERCISE 9:

Look at the partograph (see Figure 11.19) and answer the following questions.

1. On admission to hospital:
   - What was the clock time?
   - What was the cervical dilatation?
   - What phase of labour was the woman in?

2. Describe the frequency and duration of the uterine contractions at 7:00.

3. At 7:00 what was the fetal heart rate and the state of the membranes?

4. What is the purpose of the alert line?

ANSWERS TO EXERCISE 9:

1. a) 3:00  b) 3 cm   c) active phase
2. Four contractions in ten minutes, each lasting over 40 seconds, at 7:00.
3. Fetal heart rate 130/min.
   Membranes were ruptured (liquor clear) at 7:00.
4. Acts as a warning that labour in the active phase is delayed when cervical dilatation moves to the right of it; or assists in early detection of delay in labour or warns the attendant of time to transfer a woman to hospital.
Figure 11.19

**PARTOGRAPH**

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<tr>
<th>Name</th>
<th>Gravida</th>
<th>Para</th>
<th>Hospital no.</th>
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<tbody>
<tr>
<td>Date of admission</td>
<td>Time of admission</td>
<td>Ruptured membranes</td>
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<td>Cervix (cm) [Plot X]</td>
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<td>Active Phase</td>
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<td>Descent of head [Plot G]</td>
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<td>Pulse and BP</td>
<td>180 170 160 150 140 120 120 110 100 90 80 70 60</td>
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EXERCISE 10:

Recording and plotting on the partograph (see Figure 11.20)

Mrs X was admitted in labour at 14:00. On abdominal examination the contractions were two in ten minutes, each lasting 20 seconds. The head was 5/5 above the brim and the fetal heart was 130/min. On vaginal examination the cervix was 2 cm dilated, membranes were intact, no moulding felt.

Her blood pressure was 110/70 mmHg; her pulse 78/min; temperature 36.6°C. She passed 100 ml of urine; protein and acetone were negative.

1. An abdominal and vaginal examination was carried out on Mrs X at 18:00.
   Record and plot the following:
   a) Time of examination
   b) Fetal heart rate of 140/min
   c) Membranes ruptured, liquor clear
   d) No moulding
   e) Cervix 5 cm dilated
   f) Descent of the head 3/5 above the brim
   g) Uterine contractions three in ten minutes, each lasting 50 seconds
   h) Blood pressure of 105/70 mmHg; pulse 80/min, temperature 37 °C.

2. What is the latest expected time Mrs X will reach 10 cm dilatation should labour progress satisfactorily?

3. If a vaginal examination is made at 22:00 and the cervix is 7 cm dilated, what would the management be in:
   a) a health centre?
   b) a hospital?

ANSWERS TO EXERCISE 10:
1. Completed partograph (see Figure 11.21)
2. 23:00
3. a) Immediate transfer to hospital because of delay – moving to the right of the alert line
   b) Careful reassessment of cause of delay and cephalopelvic disproportion
Figure 11.20

### PARTOGRAPH

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<td>Date of admission</td>
<td>Time of admission</td>
<td>Ruptured membranes</td>
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**Graph Details:**
- **Fetal heart rate:**
  - 180
  - 170
  - 160
  - 150
  - 140
  - 130
  - 120
  - 110
  - 100
- **Liquor Moulding:**
  - 10
  - 9
  - 8
  - 7
  - 6
  - 5
  - 4
  - 3
  - 2
- **Cervix (cm) [Plot X]:**
  - 10
  - 9
  - 8
  - 7
  - 6
  - 5
  - 4
  - 3
  - 2
  - 1
  - 0
- **Descent of head [Plot O]:**
  - 10
  - 9
  - 8
  - 7
  - 6
  - 5
  - 4
  - 3
  - 2
  - 1
  - 0
- **Time (Hours):**
  - 14:00
- **Contraction per 10 mins:**
  - 5
  - 4
  - 3
  - 2
  - 1
  - 0
- **Oxytocin U/L drops/min:**
- **Drugs given and IV fluids:**
- **Pulse (and BP):**
  - 180
  - 170
  - 160
  - 150
  - 140
  - 130
  - 120
  - 110
  - 100
  - 90
  - 80
  - 70
  - 60
- **Temp °C:**
  - 36.5
- **Urine protein:**
  - 0
- **Urine acetone:**
  - 0
- **Urine volume:**
  - 100
### PARTOGRAPH

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**Diagram Details:**
- **Cervix (cm) [Plot X]**
- **Decent of head [Plot O]**
- **Contractions per 10 mins**
- **Oxytocin U/L drops/min**
- **Drugs given and IV fluids**
- **Pulse and BP**
- **Temp °C**
- **Urine**
  - protein
  - acetone
  - volume
### Appendix 1

## PARTOGRAPH

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At the end of this module participants should have:

- discussed criteria for re-classifying women when admitted in labour;
- considered in detail the use of oxytocin in labour;
- discussed a protocol for the use of oxytocin;
- discussed the diagnosis of fetal distress in labour and considered the fallibility of this diagnosis.

This is an extremely important module. Recognizing the need to re-label a labour is crucial to maintaining a safe maternity service. If a high risk labour is not recognized there is a real potential for damage to the mother and/or fetus. But if an overdiagnosis is made, there is a probability of interference in the normal. Once again we are faced with the need to find the right balance. It is the failure to do this in the past that has caused problems with maternity services and particularly with relationships between professionals and consumers.

EXERCISE IN SMALL GROUPS

Consider to what extent the design of maternity care can aid or interfere with the recognition of transition from low to high risk, and therefore, by definition, the provision of good quality care. Does the structure enable care to be appropriately timed and promptly delivered? Is care provided by the right grade of professional? (How do you define the right grade? Is it the most senior person available or is it a person with the seniority appropriate to the task?) These are fundamental questions that provoke analysis of the whole design of the health care system.

It is essential to watch for any changes. The recognition of a change is one, but only one, of the essential functions of antenatal care. It is usually not difficult to recognize change and not necessary to be an obstetrician to recognize change.

Avoid overdiagnosis. There is seldom advantage to the mother or baby.

In some circumstances labour may require intervention for reasons connected with either the mother or the fetus, the most common being poor progress in labour. Reasons connected with the mother include:

- hypertension/pre-eclampsia
- haemorrhage
- failure to progress, prolonged labour.

Reasons connected with the fetus include:

- fetal distress
- cephalo-pelvic disproportion
- fetal infection
- the presentation/lie of the fetus.
If any of these occur, the first thing is to consider the available options for action. It is by no means inevitable that medical intervention is required. Remember that attention to the details of the whole person (discomfort, pain, fear, loneliness, confusion or failure to understand, hunger and thirst) may be all that is required.

At this point the correct use of the partogram to define poor progress in labour is needed. If the Action line is crossed, action must be taken. Intervention does not necessarily mean the administration of an oxytocin infusion. Some choices for action include:

- no action
- conservative measures – ambulation, analgesia, comfort, etc.
- artificial rupture of the membranes
- augmentation
- Caesarean section.

It is essential to individualize care.

Conservative measures have long been underestimated by obstetricians. There is now good evidence to suggest they are extremely effective and safe. It may be appropriate for them to be tried before technological interventions.

Artificial rupture of the membranes is simple and cheap although it does introduce the risk of infection. While there is no good evidence to suggest that it is effective in prolonged labours, it does shorten the length of a normal labour.

The protocol for the use of oxytocin (included in this module) is used to illustrate the way in which this might be regulated. In particular, it is stressed that there is no single correct way to prescribe oxytocin, whether in terms of deciding when to commence or how to increase the dose, but that there is a definite advantage in having agreed policies within a maternity unit.

There is real and continuing controversy about augmentation. Many labours will be improved by it, but many run the risk of being interfered with unnecessarily. We do not know what proportion of labours need to be augmented. The use of partograms should help to introduce more logic into the decision-making process. All cases should be considered on their merits; inflexible rules are of uncertain value.

The following dangers are associated with augmentation:

- for the mother:
  - uterine trauma/rupture
  - uterine exhaustion: atonic uterus: postpartum haemorrhage is a major risk.
- for the fetus:
  - fetal progressive hypoxia
  - fetal cerebral trauma.
Great care should be taken if augmentation is used in the following cases:

- breech
- possible disproportion
- brow or face presentation
- previous Caesarean section
- grande multipara.

When to stop augmenting may be problematic. There is no difficulty in making a decision if there is no progress, but it is difficult to decide if progress is poor. If injury to the mother or fetus is suspected, augmentation must stop. If it is stopped, Caesarean section remains the only choice if the augmentation was truly justified.

**EXERCISE**
Discuss the details of oxytocin infusion. This is a controversial area of modern maternity practice. Recognize the level of uncertainty about this and the importance of avoiding the creation of new risks by wrongly prescribing and using oxytocin, while accepting that it has real potential for good if used properly.

**EXERCISE**
Discuss the recognition of fetal distress in labour (the other major area precipitating re-labelling), bearing in mind at all times the sensitivity and specificity of diagnostic tools.

**Protocol for the administration of oxytocin in the intrapartum period for nulliparous and multiparous women**

**Indication**
1. To facilitate induction of labour following artificial or spontaneous rupture of membranes;
2. To augment labour where slow progress is diagnosed (only after membranes are ruptured).

**Aim**
To achieve regular, effective contractions without hyperstimulation of the uterus. Adequate contractions would be deemed to occur at four and five contractions in ten minutes, with contraction duration of 45–60 seconds.

**Dose**
Five units oxytocin in 50 ml normal saline, administered via a syringe pump commencing at 1.2 ml/hour = 2 milliunits oxytocin, increasing at 15 minute intervals for both nulliparous and multiparous women to:

- 2.4 ml/hour = 4 milliunits oxytocin
- 4.8 ml/hour = 8 milliunits oxytocin
- 9.6 ml/hour = 16 milliunits oxytocin
- 19.2 ml/hour = 32 milliunits oxytocin

If contractions are still inadequate at this stage the duty obstetrician should be contacted before the dose is increased.
The amount of oxytocin required is titrated against the length, strength and frequency of contractions. In the presence of any abnormality of the fetal heart rate, call the duty obstetrician. The oxytocin infusion should not be stopped unless there is a prolonged bradcardia.

For multiparous women, oxytocin for augmentation should not be commenced without assessment by the duty obstetrician in order to eliminate other causes for slow progress, i.e. malpresentation.

Continuous monitoring of the fetal heart is necessary; a good quality trans-abdominal trace is acceptable.

**Oxytocin in second stage**

**Nulliparous women**
If, following 30–40 minutes of effective pushing no progress is made, oxytocin augmentation should be considered and prescribed by a senior midwife before consultation with obstetric staff. The dosage regime is as above, but increases are made at five minute intervals in order to achieve efficient contractions.

**Multiparous women**
Physical examination and assessment by the duty obstetrician is essential before oxytocin is commenced in multiparous women.
At the end of this module participants should be able to:

- recognize obstructed labour in either the first or second stage of labour
- understand how to manage an obstructed labour
- understand the consequences of an unrecognized obstructed labour
- consider the psychosocial components of care for women in this situation.

Obstructed labour is one of the most common problems and can be life-threatening if not recognized early.

**Obstructed labour: what it is and how it can be recognized**

A diagnosis of obstructed labour is made when, in spite of strong uterine contractions, the fetus is unable to descend any further. If it is not recognized early, the outcome for the mother and/or her baby can be severe and even life-threatening. This condition, as with many problems that occur in labour, is preventable and can be avoided. Early recognition of a labour that is not progressing normally will reduce mortality and morbidity considerably.

**How can obstructed labour be recognized?**

The reason for labour becoming obstructed is almost always some degree of disproportion between the fetal head (cephalos in Greek) and the pelvis, hence cephalo-pelvic disproportion. The amount of disproportion will determine what action is required to expedite delivery.

**EXERCISE**

With a partner, make a list of all the conditions or factors which are likely to cause cephalo-pelvic disproportion. Are there any which we could identify prior to labour commencing? Give feedback to the whole group.

Factors which predispose to cephalo-pelvic disproportion are:

- related to the fetus:
  - very large fetus over 4.5 kg, abnormal presentation – brow, shoulder, face
  - breech presentation, as cephalopelvic disproportion is difficult to exclude without radiological assessment;
- related to the mother:
  - nulliparous with short stature (below 150 cm)
  - nulliparous under 17 years of age
  - grand multiparity
  - diabetes
  - rickets
  - previous injury/trauma to the pelvis, including female genital mutilation.
Many of the above can be identified before labour begins, but not all. Sometimes the degree of disproportion is small and, with the softening of the ligaments in the pelvis during labour there may be sufficient space for delivery to occur if the contractions are strong enough. It is therefore essential for those caring for women in labour to monitor all women carefully and know how to recognize when labour is not progressing within normal limits, i.e. when it is prolonged.

**Recognition of obstruction in the first period of labour**

Diagnosis of failure to progress in labour or a radiological examination are the only definitive ways to diagnose obstructed labour. However, it is not wise to carry out unnecessary radiological examinations or to leave the labour until progress has become arrested. Often there are suspicious signs which indicate that progress is slowing. These may include:

- early rupture of the membranes – membranes rupture before contractions become established;
- abdominal palpation reveals that the fetal head is not descending;
- the contractions may start but reduce in strength, regularity or duration;
- contractions become excessively strong or frantic;
- severe pain;
- the woman becomes exhausted, looks unusually anxious and signs of dehydration occur, ketones in urine, urine may become dark and reduced in quantity, breath smells acidotic, tongue looks dehydrated;
- cervical dilatation is slow, or cervix does not dilate at all;
- fetal heart becomes erratic, the rate alters especially during and after the contraction and takes time to return to pre-contraction rate;
- excessive caput succedaneum due to pressure on the fetal head;
- presence of a visible tonic constriction ring (a pathological retraction ring noticeable at or just below the level of the umbilicus); this occurs at the junction of the upper and lower uterine segment and is due to the excessive thinning of the lower uterine segment (Figure 13.1). The presence of such a ring indicates imminent rupture of the uterus and must always be treated as an emergency.

**Recognition of obstruction in second stage of labour**

Obstruction is often easier to notice during the second stage of labour. The fetal head does not descend. In occipito-posterior positions, internal rotation may stop (the sagittal suture stays in the transverse diameter – this occurs when the fetal head gets arrested at the level of the ischial spines).

**GROUP WORK**

In small groups look at the partogram labelled No. 2 and decide what time it was when the first problem was noticed. If you were in the community or at a small health post with no doctor or facilities, what would you have done at that point?
Answers
The first time something could have been noticed was 19:00 when the contractions appeared to have reduced in both regularity and strength.

There could be many reasons for this. There is sometimes a transient slowing of the contractions if the bladder is full or after the mother has been given a strong analgesic such as pethidine. If her bladder is full, you could try getting her to empty it. If you have just given her some analgesia you might wait for an hour or so to see if, after a short rest, the strength and regularity returned.

However, from the partogram we notice she emptied her bladder at 18:30. We can also see she had not been given any drugs. Thus we can conclude that the cause is not due to either a full bladder or the effects of analgesia. The midwife must refer the woman for more specialized care without delay.

An obstetrician would examine the woman to see if there were any signs of cephalo-pelvic disproportion and then institute the appropriate action to bring about a safe delivery.
What will happen if obstructed labour is not recognized?

1. The mother may die due to the uterus rupturing. Signs that the uterus has ruptured include cessation of contractions, severe shock, no fetal heartbeat, and sometimes the ability to palpate fetal parts easily.

2. The mother may be left with either a vesico-vaginal fistula or recto-vaginal fistula due to the damage caused between the fetal skull and the bony pelvis; the prolonged pressure of the fetal skull causes trauma and eventually necrosis.

3. Puerperal sepsis may result, especially if the membranes ruptured early and/or there were many vaginal examinations or an operative delivery.

4. The fetus may also be subject to infections in the early neonatal period for the same reasons as the mother.

5. The fetus can die or be left permanently damaged. With each contraction there is a reduction in oxygen transfer via the placenta to the fetus. The fetus becomes progressively more hypoxic and eventually develops a metabolic acidosis secondary to anaerobic (hypoxic) metabolism. Fetal injury may also be caused by high levels of blood CO₂ (accumulating as a result of restricted trans-placental gas exchange) triggering intracerebral vascular spasm, which may later predispose to fetal intraventricular haemorrhage. If the fetus is not dead, it can be born with birth asphyxia or be left with permanent brain damage as a result of obstructed labour. Unrecognized or unrelieved hypoxic fetal distress is thought to be a cause of at least 5% of cases of cerebral palsy in Europe.

6. If the fetus dies in utero the mother may develop disseminated intravascular coagulation (DIC), which is a very serious condition that can lead to severe haemorrhage and is life-threatening.

Emotional support for the woman and her family

Remember to consider the woman’s feelings during a difficult labour as well as those of her companions. Anxiety and fear, coupled with exhaustion, will be very difficult to deal with for all concerned and she will need continuous support and care from the attending midwife. It is not necessary to exclude family members from situations which become difficult unless they are interfering with your ability to care for the woman. Often, when things go wrong, the woman needs her supportive companions even more than before and they can assist you to keep her calm and attentive to your advice. Also, if companions see that you are trying everything you can to help the woman they are less likely to be angry or accusatory after any disastrous consequences. But remember that they will need explanation and encouragement if they are to collaborate with you and assist you to help the woman.

Summary and conclusions

The appalling complications from obstructed labour are only seen if the woman has not had adequate supervision and monitoring during the labour. The midwife can do a great deal to reduce both the incidence of true obstructed labour and the unacceptably high mortality and morbidity that follow cases of obstructed labour. Protocols should be set in each locality for all cases of prolonged labour. When any labour becomes prolonged the midwife must take prompt and decisive action. Table 13.1 gives a suggested protocol.
Table 13.1 Protocol for cases of prolonged labour

<table>
<thead>
<tr>
<th>In the community</th>
<th>At a type II health centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Encourage the mother to empty her bladder frequently and to empty her bowel.</td>
<td>• Empty bladder frequently, empty bowel.</td>
</tr>
<tr>
<td>• Refer to higher centre if labour lasts more than 12 hours.</td>
<td>• Monitor labour with partogram and refer if abnormal, otherwise refer if labour lasts more than 12/24 hours (depends on local policy/anticipated travel time from centre) or if there is malpresentation, disproportion or fetal distress.</td>
</tr>
<tr>
<td></td>
<td>• Start antibiotics before referral if there is prolonged rupture of membranes or signs of infection.</td>
</tr>
<tr>
<td></td>
<td>• Assist second stage with vacuum extractor or forceps if indicated.</td>
</tr>
</tbody>
</table>

*Source: Care of the mother and baby at the health centre: a practical guide (WHO 1994).*
At the end of this module participants should be able to:

- recognize the physiological changes that take place during the second stage of labour;
- recognize the importance of encouraging a woman to adopt whatever position she feels is comfortable for delivery of her baby (second stage of labour);
- know that the supine position (with or without stirrups) is the least beneficial position for delivery;
- understand that episiotomy should not be performed routinely and should be a relatively infrequent occurrence;
- promote skin-to-skin care of the mother and baby from the moment of delivery on and facilitation of the first breastfeed when the baby shows signs of readiness, usually within the first hour or so after delivery;
- use the Apgar score.

**Readings:**

Maternal positions for labour and birth
Summary of alternative positions in labour
Principles of birth

**Physiology of the second stage**

The second stage of labour is from the full dilatation of the cervical os to the birth of the baby.

The physiological changes that take place are designed to achieve descent of the fetus through the birth canal and expulsion of the baby.

These are summarized as follows:

- the contractions are stronger and longer and may be less frequent; they aid expulsion;
- the secondary powers of the diaphragm and abdominal muscles are employed to aid the expulsive effort;
- the pelvic floor is displaced by the advancing fetus;
- the fetus is expelled.

The second period of labour begins when the cervix is completely dilated (10 cm) and the fetal head moves down into the birth canal. The mother is often better able to cope with the pain in the second stage because she is actively involved. The act of pushing may distract her attention from the uterine contractions.

The mother will have an involuntary urge to push when the head exerts pressure on the pelvic floor. It is much better to wait for this rather than encourage the mother to push before she is ready.
As the baby’s head descends it rotates when it meets the resistance of the pelvic floor. The head descends and rotates further when it comes down under the pubic bone. “Crowning” occurs when the head stretches the vaginal opening and remains in this position between contractions. The head then emerges as the fetal neck extends and the face glides over the perineum. The body rotates – first one shoulder then the other – and is delivered.

The fetal head has been subject to considerable pressure in its journey down the birth canal. It is therefore essential that the delivery of the head is controlled, especially since the skull bones of the baby are relatively soft and not fused allowing them to overlap during the passage down the birth canal. It is this moulding of the skull that often causes the head of the newborn baby to look pointed after delivery.

Once the head is delivered the attendant must feel for the umbilical cord around the baby’s neck; if it is present it may be helped to slide over the baby’s head if loose, or be clamped and cut if it is tightly looped around the neck. However, normally the cord would be clamped and cut once the baby has been delivered and the cord has stopped pulsating.

The second stage of labour should take from 30 minutes to one hour, although recent approaches tend to regard these time limits as guidelines only and not rigid boundaries indicative of a need for intervention. (In the case of a mother with functioning epidural analgesia the desire to push may be seriously impeded and the length of the second stage will then be considerably increased.) The status of the mother and infant is a better indicator of whether intervention is needed to assist at this point than simply the length of time that has passed.

It should be remembered that delivery is not sterile but clean. Caps and masks should be abolished and aprons and gowns used only by those who wish to protect their own clothing.

**EXERCISE**

Discuss the average length of the second stage of labour for primiparous and multiparous women in the unit where you work, identify the variables and the outcome. Prepare to give feedback to the main group.

**Position of the woman during labour**

The mother should be allowed to adopt whatever position is most comfortable, although she should be discouraged from lying on her back as this could cause supine hypotension syndrome. Mothers may feel more comfortable in a vertical upright position, which will also assist the descent of the fetus. Standing, sitting, kneeling or squatting positions are used by many mothers in the second stage of labour. The assistance of a partner is required in some cases to give support.

The supine delivery position, traditionally used during this century in many maternity systems, is the least beneficial position to adopt for labour and delivery. If it is used even so, the woman’s legs should not be placed in stirrups as this is a most undignified position for a woman to adopt for delivery. If the legs need support, this is better provided by personal touch or by resting her feet on the bed than by using stirrups.
It is preferable for the woman to deliver in the position which is most comfortable for her both physically and psychologically. Many delivery units are now trying to offer the most natural positions for delivery possible within the hospital setting (or at home). They range from positions which may be used in any environment (e.g. on the floor, on a normal bed, on the woman’s side,
leaning over a chair, on all fours, or whatever other position the woman herself feels comfortable with) to delivery in standard hospital beds in semi-supported positions. Beds that divide for delivery where the bottom half is removed and the mother’s buttocks rest at the very edge of the bed, are most unnatural for women and less desirable than most positions.

**Pushing in the second stage of labour**

The mother will usually have an overwhelming desire to push with each contraction. It is much better to allow her to push naturally than to instruct her to take a deep breath and push down (which has been found to reduce oxygen supply to the fetus). Once crowning of the head has taken place the mother is instructed to pant or puff, allowing the head to advance slowly, minimizing the risk of damage to the head and maternal birth canal.

**Perineal care**

Reducing the risk of perineal trauma is important because the consequent discomfort can dominate the experience of motherhood and result in significant disability during the months and years that follow. Perineal damage can occur from spontaneous laceration, from episiotomy and from unnecessary manipulation of the vagina and perineum.

There is still debate as to the benefits of guarding the perineum with the birth attendant’s fingers held against the perineum during contractions or the maintenance of a “hands off” approach. In any event inserting the fingers into the vagina and stretching it or sweeping the vagina are unnecessary and potentially harmful.

**Episiotomy**

Episiotomy is no longer regarded as a routine procedure for even primiparous birth. Current research indicates that this procedure should be performed only when medically indicated and quite possibly in less than 10% of deliveries. There is no justification for the routine use of episiotomy.

Analgesia should **always** be used when performing an episiotomy.

**Psychological sensitivity**

It should be remembered at all times that the first few minutes and hours of contact between a mother and her newborn baby (and her partner if he is present) are very special life moments. They will probably be remembered forever and make a lasting impression on the woman. Feelings evoked at this time may influence the relationship between the mother and baby for years to come. It is essential for the health care provider to remain sensitive to this impressionable period and to care for the family with support, encouragement and praise. There is no place for harsh tones, words or criticism at this time.

Sometimes casual comments are made in an effort to make light of difficult moments during birth or the postpartum period. These jokes, while well meant, can usually be offensive and hurtful for women and their partners and should be made with caution or not made at all.

The experience of giving birth should be a warm, deeply personal and sensitive one, which later evokes good memories rather than bad. While pain is very much a part of birthing it is not, according to recent research, synonymous with a lack of satisfaction with birth. Women who experience pain may also experience very satisfying births and those who do not experience pain (with, for example, an epidural) do not always recall their birth experience as satisfying. It is
likely that an environment which supports a woman during the birth (which is critically influenced by those around her) contributes most to satisfaction with her birth experience.

GROUP EXERCISE
Discuss any incidents which you have observed in the delivery room which women might perceive and experience as hurtful. What can be done to avoid these?

**Delivery of the baby**

The value of routine suctioning to remove secretions from the newborn infant’s oral or nasal passages is uncertain. If nasal and pharyngeal suctioning is used care should be taken to minimize pharyngeal stimulation. Suction bulbs rather than catheters should be used because suction bulbs are less likely to induce cardiac arrhythmias. As the passage of the tube during routine suctioning of the stomach in the immediate neonatal period may produce bradycardia or laryngospasm and disruption of prefeeding behaviour, there is no justification for routine gastric suctioning in the delivery room.

Once the head has been delivered, the body should be delivered with the next contraction onto the mother’s abdomen or into her arms. This allows skin-to-skin contact of mother and baby to occur. The baby should be dried while on the mother’s abdomen to avoid sudden heat loss and the mother can assist with this process. The wet towel should be removed immediately and replaced with a dry towel. It is vital that the environment of the room where the birth is to take place should be warm and free of draughts (not less than 25°C). Keeping the baby’s head covered is important because at 25% of her/his body size it is a major source of heat loss. One of the most effective ways of maintaining the baby’s temperature is by continuous skin-to-skin contact with the mother after delivery while both mother and baby are covered with warm blankets.

It is important to assess the condition of the baby at delivery. A quick and easy system can be used in order to identify newborns that are in need of immediate resuscitation by looking at the two most important indicators:

- breathing
- heart rate.

Assessment of the infant by these two parameters alone allows rapid identification of babies with mild or severe neonatal asphyxia. Resuscitation may then be provided where appropriate.

A more complex method of infant assessment is the Apagar score, originally designed by Virginia Apgar to classify the condition of infants exposed to obstetric analgesia or anaesthesia. The following clinical signs are assessed at one and five minutes (and, where appropriate, ten minutes) after delivery: heart rate, respiratory effort, muscle tone, reflex response to stimuli and skin colour, giving a score of zero, one or two for each feature. Most healthy babies have a score of nine, with two points for each feature except colour (because the extremities are usually blue at birth). These indicators are summarized in the Table 14.1.
Table 14.1 Apgar score

<table>
<thead>
<tr>
<th>Sign</th>
<th>Score 0</th>
<th>Score 1</th>
<th>Score 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>Absent</td>
<td>Below 100/min</td>
<td>Above 100/min</td>
</tr>
<tr>
<td>Respiratory effort</td>
<td>Absent</td>
<td>Slow/irregular</td>
<td>Good cry</td>
</tr>
<tr>
<td>Muscle tone</td>
<td>Limp</td>
<td>Some flexion of extremities</td>
<td>Active</td>
</tr>
<tr>
<td>Reflex irritability</td>
<td>No response</td>
<td>Grimace</td>
<td>Cough</td>
</tr>
<tr>
<td>Colour</td>
<td>Blue</td>
<td>Body pale pink, extremities blue</td>
<td>Pink</td>
</tr>
</tbody>
</table>

There are, however, many problems with this method, including that:

- too often it is incorrectly evaluated; to perform the evaluation of the Apgar score accurately takes some time, which may waste precious time if rapid evaluation and resuscitation are needed;
- it is not predictive of outcome (only very low Apgar scores at 10 and 20 minutes after birth are predictive of neurological damage).

The baby needs to be examined for signs of abnormality and the cord must be checked at frequent intervals for signs of bleeding. These examinations can be done while the baby remains on the mother’s abdomen.

Unless medically indicated, the baby should not be removed from the mother’s abdomen for the first hour or more after birth. Skin-to-skin contact should be maintained during this time with as little interference as possible in the contact between mother and baby. Only essential care should be administered. Traditional routines (such as bathing, wrapping, measuring and administration of eye-drops) should be delayed until an hour or two later unless the mother’s or baby’s condition precludes this. Removing the baby from the mother for even these simple procedures has been shown to interfere with the process of breastfeeding and to disrupt the early attachment process between mother and infant.

EXERCISE
Role-play – practise positions that could be adopted in the second stage of labour.

DISCUSSION
Discuss whether the protocols and practices currently used by your service for delivery require modification. How could they be modified? What action could you take to encourage revision and modification of current protocols and practices?
Module 14. Reading

Episiotomy policies in vaginal births

Cochrane reviewers: Guillermo Carroli, José Belizan, Georgina Stamp
RHL commentary: Jerker Liljestrand

Date accepted: 5 April 1998

1. The Cochrane review

1.1 Main findings of the Cochrane review
Restrictive use of episiotomy in uncomplicated vaginal births, as compared with routine episiotomy, is associated with reduced risk of posterior perineal trauma and need for suturing perineal trauma. There is no difference in risk of severe vaginal or perineal trauma, pain, dyspareunia or urinary incontinence. There is, however, a somewhat increased risk of anterior perineal trauma. The review does not resolve the question of what type of episiotomy should be preferred, midline or mediolateral.

1.2 Methodology of the Cochrane review
All appropriately controlled thais that could be identified have been included.

2. Relevance to under-resourced settings

2.1 Magnitude of the problem
Routine episiotomy, or liberal use of episiotomy, is unfortunately very common, both in under-resourced settings and in some developed countries. The latter may be contributing to the persistence of this practice also in under-resourced settings despite overwhelming evidence against its routine use.

With the HIV/AIDS epidemic still growing rapidly in many countries, and with the most stricken countries having more than one-third of women giving birth HIV infected, both protection of the health workers and the risk of vertical transmission from episiotomy must be considered. During suturing of episiotomies the risk of a finger-prick injury is high, especially if a small needle is used. Current data indicate that the role of mother-to-child HIV transmission at birth may have been underestimated. Thus, any invasive intervention may increase the risk of vertical transmission.

There are therefore strong reasons to counteract the overuse of episiotomy in developing and developing countries alike.

2.2 Feasibility of the intervention
Some countries, both developed and developing, have successfully reduced their episiotomy frequencies.

The moderate increase of anterior trauma shown by this review should not be a deterring factor. Anterior perineal trauma is usually slight, and as indirectly showed by this Cochrane review, the increase in anterior trauma was not associated with increase in severe trauma, nor did it lead to a greater need for suturing.
2.3 Applicability of the results of the Cochrane review

The results of the review apply equally to developed and developing countries. One area where not enough is known, however, is the routine use of episiotomy in women who have undergone any of the types of female genital mutilation (FGM). In its most advanced forms, FGM severely restricts the vaginal outlet, and both practice by traditional birth attendants and health care staff in such cases includes routine episiotomy. Not enough is known about the optimal application of episiotomy in women with FGM, both as regards indication and technique.

2.4 Implementation of the intervention

Limiting the use of episiotomy to strict indications has been done in some countries through adherence to standard protocols, training/retraining, and supervision and quality improvement processes. Considering the strength of the evidence and the common occurrence of the procedure, decreasing episiotomy rates can be seen as a litmus test for the application of evidence-based reproductive health care.

2.5 Research

Further exploration of the relative merits of midline versus mediolateral episiotomy is needed. In this case results from controlled studies in developed countries could be applicable also in resource-poor settings.

Studies on obstetric consequences of FGM should evaluate the value of episiotomy in this group of women.

Source of support: World Health Organization, Geneva, Switzerland.

Source: WHO Reproductive Health Library 1999 Issue 2
Module 14. Reading
Maternal Positions for Labour and Birth

Standing
Standing, leaning forward
Squatting
The lunge (standing)
The lunge (kneeling)
Sitting upright
Sitting on exercise ball
Semi-sitting
Sitting, leaning forward with support
Hand and knees
Kneeling over chair seat
Kneeling, leaning on raised head of bed
Kneeling over birth ball
Side-lying
Squatting
Supported squat
The dangle

Illustrations by Sheena Finger (© 1994 Ruth Anehwe) from the upcoming book on nursing interventions to prevent or correct dystocia in labor, by Ruth Anehwe and Penny Snaith

Maternal positions for labor and birth. Top row, upright positions; second row, sitting positions; third row, kneeling positions; fourth row, second-stage positions. See Table 1 for explanations.
### Module 14. Reading

#### Summary of Alternative Positions in Labour

<table>
<thead>
<tr>
<th>POSITION</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standing</strong></td>
<td>- Increased efficiency in expulsion of the fetus, especially where the fetus presents in a posterior position.</td>
<td>- Tiredness.</td>
<td>- Comfort of the mother.</td>
</tr>
<tr>
<td>- includes supported and unsupported positions of an upright and forward nature</td>
<td>- Less perineal trauma.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Increased maternal involvement and pleasure.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Squatting</strong></td>
<td>- Increased pelvic diameters.</td>
<td>- Tiredness, needs antenatal preparation.</td>
<td>- Need to discuss in antenatal period.</td>
</tr>
<tr>
<td>- includes supported squatting</td>
<td>- Aids force of gravity. Fewer assisted deliveries.</td>
<td>- Requires support to maintain position for prolonged periods of time.</td>
<td>- Adaptation of equipment in a labour ward.</td>
</tr>
<tr>
<td></td>
<td>- Less perineal trauma.</td>
<td>- Transient vulva oedema.</td>
<td></td>
</tr>
<tr>
<td><strong>All fours</strong></td>
<td>- Aids rotation and descent.</td>
<td>- Increased vulva trauma.</td>
<td>- Aids required for support and comfort of the women.</td>
</tr>
<tr>
<td>- includes kneeling</td>
<td>- Relieves backache.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Relief of pressure on prolapsed cord.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Aids delivery of shoulders in cases of shoulder dystocia. Less perineal trauma.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Birthing chairs</strong></td>
<td>- Facilitates upright maternal position without aids of other people giving support.</td>
<td>- Increased risk of postpartum haemorrhage.</td>
<td></td>
</tr>
</tbody>
</table>
Module 14. Reading
WHO Principles of Care in Labour and Delivery

IN GENERAL:

- Provide free access of women's family to labour, delivery and postpartum wards according to the mother's wishes.
- Provide emotional support for women and their companions.
- Women should participate in decisions about their care.
- Provide one-to-one care in labour; one midwife for every mother.
- Women should not be left alone in labour at any time.
- Provide privacy for women in labour; one woman per room.
- Only those who are directly involved in care should be in the delivery room.
- Require all staff to introduce themselves to the mother and explain their responsibilities.
- Do not rush with:
  - second stage pushing
  - episiotomy
  - resuscitation
  - neonatal examination
  - breastfeeding.
- Speak to the mother: encourage and praise her and provide needed information about her care.

IN LABOUR:

- Routine electronic fetal heart monitors should not be used especially without fetal scalp blood sampling. Regular fetal auscultation is recommended.
- No routine shaving of the pubic or perineal areas.
- No routine enemas.
- Induction should only be done on clear indication and not routinely. Avoid routine induction until 42 weeks.
- Avoid routine analgesics and anaesthetics, sedatives and tranquillizers.
- There is no justification for routine amniotomy.
- There is no justification for routine amnioscopy.
- No routine intravenous fluids – encourage the mother to drink or eat as she needs.
- Adopt a “hands off” approach to perineal care:
  - do minimal vaginal examinations, following the indications of the partogram
  - keep hands and fingers out of the vagina
  - do not “stretch” the perineum.
AT DELIVERY:

- A vertical position for delivery is preferable. Women should avoid the lithotomy position. The use of stirrups is to be discouraged. The most comfortable upright position for her delivery should be chosen by the woman herself.
- Routine episiotomy is to be avoided.
- The Caesarean section rate should range from about 5–15% depending on the level of the health care facility. The average rate for a country should be in the region of 10%.
- Encourage vaginal delivery after a previous Caesarean section – about 50% of women will be able to deliver vaginally.

AFTER BIRTH:

- Mothers and babies should not be separated from the time of delivery onwards.
- Early attachment to the breast should be encouraged with skin-to-skin contact.
- Breastfeeding should be facilitated as soon as the baby shows signs of readiness for a feed, usually within the first hour or so after delivery.
- Unlimited contact of mother and baby after birth reduces problems of infant feeding.
- No routine “cervical control” (examination of the cervix with the aid of speculum).
- No routine stitching of minor vaginal or perineal lacerations.
By the end of this module participants should be able to understand the physiology of the third stage of labour.

Reading:
The Bristol Third Stage Trial

The third stage of labour is the separation and expulsion of the placenta and membranes.

The physiological changes that occur in the third period of labour are designed to facilitate separation and expulsion of the placenta and fetal membranes, and to ensure control of maternal bleeding.

Summary of physiological changes:
- the retraction of uterine muscles is accelerated by the birth of the baby so that by the third stage the uterus is already diminished in size;
- as the uterus contracts strongly the placenta is squeezed, forcing blood from the intervillous spaces into the spongy layer of the decidua;
- retraction of the uterine oblique muscle fibres prevents blood entering the maternal system;
- blood seeps between the thin septa of the spongy layer and the placental surface, aiding separation;
- the placenta normally separates from the centre outwards, and the formation of a retroplacental clot exerts further pressure;
- once separation has occurred the uterus contracts causing the placenta and membranes to descend into the lower uterine segment from where they are expelled.

Haemostasis

The normal blood flow through the placental site is 500–800 ml per minute. Following separation this must stop immediately or serious haemorrhage occurs.

Three factors are involved:
1. the “living ligatures” – these are the interlacing muscle fibres, the blood vessels of which become restricted when contraction and retraction occurs;
2. the opposition of the uterine walls once separation and expulsion of the placenta and membranes has occurred;
3. transitory activity of coagulation and fibrinolytic systems.

The third stage of labour is from delivery of the baby to delivery of the placenta and membranes, and usually takes about 15–20 minutes. After the baby has been delivered the uterus contracts (after a pause) and separation of the placenta occurs. This is noted by a trickle of blood, and the
attendant may observe the cord lengthening as the placenta descends into the lower part of the uterus.

Artificial stimulants (ergometrine, syntometrine or equivalent) which induce contractions of the uterus can be given to the mother intramuscularly after the delivery of the anterior shoulder of the baby or after the birth of the baby. This will quicken the third stage of labour and reduce the amount of bleeding and is referred to as active management of the third stage. With active management, the placenta and membranes can then be delivered by controlled cord traction, after ensuring that the placenta has separated before traction is exerted on the cord.

Putting the baby to the breast will also stimulate the uterus to contract by stimulating natural maternal oxytocin secretion. Unless the placenta shows signs of retention or there is excessive bleeding, the baby should not be put to the breast in order to stimulate contractions. Instead, breastfeeding should be allowed to occur when the baby shows signs of readiness for a feed. Forcing the baby to attach to the breast within minutes after delivery is no longer regarded as appropriate care.

Allowing the third stage of labour to progress naturally may take a little longer than actively managing it, but it is just as safe and is less likely to make the mother feel unwell with the effect of the drugs. The blood loss is, however, on average, somewhat greater. In this approach, the placenta is delivered by maternal effort alone, and traction must not be applied to the cord to assist the delivery. Instead, the cord and placenta should be guided out. There is no need to hurry this process unless there is excessive bleeding, in which case IM ergometrine or IV oxytocin must be given.

The placenta and membranes need to be examined to establish if they are complete and nothing has been retained within the uterus.

If bleeding continues after delivery of the placenta, due to relaxation of the uterus, the top of the uterus is massaged with a circular motion and slight fundal pressure applied to expel any clots within the uterus. The uterus should become firm after gentle massage. It is not appropriate to place ice packs on the mother’s abdomen to assist this process since this is very uncomfortable for the mother and has not been shown to be effective in reducing haemorrhage.

After delivery of the placenta the vagina and perineum are observed for any signs of excessive bleeding or damage during the delivery. Small tears to the perineum (other than major second and all third degree tears) have been found to heal better without sutures, but the perineum must be kept clean and therefore the need for personal hygiene must be stressed to the mother. It is not necessary routinely to visualize the cervix after birth to check for tears or to swab the vagina with any antiseptic solutions. Only if bleeding is not contained must small tears be sutured.

The mother’s vital signs (pulse and blood pressure) must be checked approximately one hour after delivery, the uterus must be abdominally palpated to make sure that it remains well contracted, and a check must be made that the loss per vaginam is not excessive.

Breastfeeding is one of the most important early contributions to neonatal, infant and child health growth development. The benefits are greatly enhanced if breastfeeding starts within an hour or so after birth. This should occur when the baby shows signs of being ready for a feed (salivation, rooting reflex, mouth movements, hand sucking, etc.). For the baby of an unmedicated mother this will occur spontaneously within about an hour after delivery. The process is delayed if the
mother–infant skin-to-skin contact after delivery is disturbed and in babies who may have received medication via their mother (for example, for pain management during labour).

Recent experiences and research in many countries has shown that there is less need for intervention during labour than was previously believed. It is now recognized that intervention during labour and after birth should be kept to a minimum, allowing the mother to maintain control during this important period of her life and leading to a more fulfilling experience for her. The ideal approach to adopt for most deliveries is of watching and waiting (and not interfering unless essential).

**Repair of the perineum**

Research demonstrates that if the perineum requires repair it should be done as quickly as possible. Various studies have been undertaken to test the effectiveness of both the type of suture material used and the actual technique. The results at present show that a continuous subcuticular suture using an absorbable material gives the best results (Enkin 1995).

The mother should always receive analgesia before any repairs to the vagina and perineum are undertaken.

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**FURTHER WORK/HOMEWORK**

Discuss with colleagues the policy in your unit for managing the third stage of labour. With the help of the summary of the Bristol Third Stage Trial (see handout: summary of *Bristol Third Stage Trial* (1988)), develop a strategy for the future.
The Bristol third stage trial: active versus physiological management of third stage of labour

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Abstract

Objective – To compare the effects on fetal and maternal morbidity of routine active management of third stage of labour and expectant (physiological) management, in particular to determine whether active management reduced incidence of postpartum haemorrhage.

Design – Randomized trial of active versus physiological management. Women entered trial on admission to labour ward with allocation revealed just before vaginal delivery. Five months into trial high rate of postpartum haemorrhage in physiological group (16.5\% vs. 3.8\%) prompted modification of protocol to exclude more women and allow those allocated to physiological group who needed some active management to be switched to fully active management. Sample size of 3900 was planned, but even after protocol modification a planned interim analysis after first 1500 deliveries showed continuing high postpartum haemorrhage rate in physiological group and study was stopped.

Setting – Maternity hospital.

Participants – Of 4709 women delivered from 1 January 1986 to 31 January 1987, 1695 were admitted to trial and allocated randomly to physiological (849) or active (846) management. Reasons for exclusion were: refusal, antepartum haemorrhage, cardiac disease, breech presentation, multiple pregnancy, intrauterine death and, after May 1986, ritodrine given two hours before delivery, anticoagulant treatment and any condition needing a particular management of third stage.

Interventions – All but six women allocated to active management actually received it, having prophylactic oxytocic, cord clamping before placental delivery, and cord traction; whereas just under half those allocated to physiological management achieved it. A fifth of physiological group received prophylactic oxytocic, two fifths underwent cord traction and just over half clamping of the cord before placental delivery.

Endpoint – Reduction in incidence of postpartum haemorrhage from 7.5\% under physiological management to 5.0\% under active management.

Measurements and main results – Incidence of postpartum haemorrhage was 5.9\% in active management group and 17.9\% in physiological group (odds ratio 3.13; 95\% confidence interval 2.3 to 4.2), a contrast reflected in other indices of blood loss. In physiological group third stage was longer (median 15 min vs. 5 min) and more women needed therapeutic oxytocics (29.7\% vs. 6.4\%). Apgar scores at one and five minutes and incidence of neonatal respiratory problems were not significantly different between groups. Babies in physiological group weighed mean of 85 g more than those in active group. When women allocated to and receiving active management (840) were compared with those who actually received physiological management (403) active management still produced lower rate of postpartum haemorrhage (odds ratio 2.4; 95\% CI 1.6 to 3.7).
Conclusions – Policy of active management practised in this trial reduces incidence of postpartum haemorrhage, shortens third stage, and results in reduced neonatal packed cell volume.

Introduction

In 1984 a survey of policies for the care of obstetrically normal women in maternity units in England showed that a policy of active management (giving oxytocin-ergometrine, clamping the cord early, and applying controlled cord traction) was virtually universal in those units that were known to have a policy for managing the third stage of labour (1). Two out of 238 consultant units reported that one or more obstetricians used oxytocin rather than oxytocin-ergometrine routinely. Some general practitioner and consultant units reported that they offered women a choice about management of the third stage in their discussion of the birth plan, and others reported that their policy was to use active management except when women requested otherwise.

Active management has recently been challenged (2, 3) because obstetric routines have come under general attack and because its scientific basis, particularly the use of prophylactic oxytocsics, has been questioned. Dunn et al. have shown that these obstetric practices may interfere with physiological processes to the detriment of both mother and baby (4–8). More recently, Inch suggested that routine active management of the third stage of labour promotes a cascade of intervention through which controlled cord traction becomes necessary because: (a) women are delivered of the placenta without the aid of gravity; (b) the umbilical cord is clamped early and routinely; and (c) a prophylactic oxytocic has been administered (9). These contentions have not been tested in a randomized controlled trial.

A review of controlled trials in which routine use of an oxytocic was compared with either a placebo or no routine prophylactic suggested that oxytocic drugs reduce the risk of postpartum haemorrhage and the need for therapeutic oxytocics but increase the risk of hypertension (10). Many of the papers on which this analysis was based, however, did not study other aspects of the management of the third stage of labour.

In 1984 Romney and White called for a “relook at masterly inactivity in a proper controlled trial … before the best exponents of non-active management have retired from service (11)”. The purpose of the Bristol third stage trial, therefore, was to determine whether, in terms of maternal and fetal morbidity, continuing with routine active rather than expectant (physiological) management of the third stage of labour was justified.

Patients and methods

All women who were expected to deliver vaginally in Bristol Maternity Hospital during the period of the trial were eligible to enter. The principal criteria for exclusion when the main trial began in January 1986 were refusal to participate, cardiac disease, antepartum haemorrhage, breech presentation, multiple pregnancy and intrauterine death. In addition, midwives and obstetricians did not enter women if they thought that there were good reasons for excluding them. These reasons were fully documented.

In the antenatal clinic women were given a leaflet explaining the trial, asking them to return a slip if they did not wish to take part and telling them where they could get further information about the trial. On admission to the labour ward women who were eligible were reminded about
the trial. Those who agreed to participate had their names entered into a register of trial numbers. Correspondingly numbered, sealed opaque envelopes were placed in the women’s notes. When the midwife or obstetrician was ready to prepare for delivery the time was recorded on the outside of the envelope. The envelope was then opened and showed which of two methods of management the woman had been randomly allocated to.

All women for whom an envelope was opened were deemed to have entered the trial and were followed up regardless of subsequent management. Women who became ineligible after being entered into the register but before the envelope was opened were deemed not to have entered the trial and were not included in the analysis. Their envelopes were returned unopened to the trial coordinator and the criteria for exclusion noted. The envelopes contained one of two sets of instructions: attempt to manage the third stage actively or attempt to allow physiological delivery of the placenta (box).

The primary hypothesis tested by the trial was that active management reduces the incidence of postpartum haemorrhage (blood loss ≥500 ml) compared with physiological management. If active management reduced this incidence from 7.5% under physiological management to 5.0% (as existed in 1983 in the Bristol Maternity Hospital under a system of active management) then a sample size of 3900 would give an 80% chance of detecting this difference at \( p < 0.05 \). An independent data monitoring committee (comprising an obstetrician a midwife and an epidemiologist) was established, and an interim analysis was planned on data from roughly the first 1500 mothers and babies, firstly to provide a better estimate of the incidence of postpartum haemorrhage under physiological management and, secondly to check that there were no clinically important adverse effects of either management policy.

In addition to determining the incidence of postpartum haemorrhage and more objective measures of maternal blood loss the trial aimed at testing the effect of the different management policies on other maternal variables. These were the length of the third stage; the need for therapeutic oxytocics, manual removal of the placenta, and evacuation of retained products of conception; and side effects of the oxytocics such as nausea, headaches, and hypertension. Neonatal variables considered were the Apgar score, packed cell volumes (<0.50 or >0.65), admission to a special care nursery, jaundice and breastfeeding.

Data on these variables, the trial population, including factors that might modify the effect of the management policy, and the actual management of the third stage were available from the routine computerized data collection system at the hospital (12). The files were rendered anonymous and transferred to the national perinatal epidemiology unit for analysis. Additional information about subsequent evacuation of retained products of conception was obtained from all the hospitals in the Frenchay and the Bristol and Weston health districts. Questionnaires asking for the views of staff and mothers were sent to a subsample towards the end of the trial.

The Bristol and Weston Health Authority ethics committee approved the study.

Continuous data were analysed with the \( t \) test. For categorial data the \( \chi^2 \) test with Yates’s correction was used to compare methods of management, and odds ratios and their 95% confidence intervals were used to compare results between the groups.
Details of management

ACTIVE MANAGEMENT

Attempt to manage the third stage actively:
- Try to give one ampoule of the oxytocic (five units oxytocin and 0.5 mg ergometrine maleate routinely or ten units synthetic oxytocin if the mother has raised blood pressure) immediately after delivery of the anterior shoulder.
- Try to clamp the cord 30 seconds after delivery of the baby.
- When the uterus has contracted try to deliver the placenta by controlled cord traction with a protective hand on the abdomen helping to shear off the placenta and preventing uterine inversion.
- Try not to give any special instructions about posture.

If placenta is retained after one hour:
- Ensure the bladder is empty.
- Reattempt delivery by active management.
- Remove placenta manually under general anaesthetic or epidural block.

PHYSIOLOGICAL MANAGEMENT

Try to allow physiological delivery of the placenta:
- Try not to give an oxytocic.
- Try to leave the cord attached to the baby until the placenta is delivered.
- Try not to use controlled cord traction or any manual interference with the uterus at the fundus.
- Try to encourage the mother to concentrate on feeling for the next contraction or an urge to push When the mother feels this contraction or an urge to push or there are signs of separation encourage maternal effort and encourage the mother to adopt a posture aiding delivery by gravity – that is, standing, kneeling, on all fours, squatting, sitting on a bed pan.
- If the placenta does not deliver spontaneously wait, try putting the baby to the breast, and encourage maternal effort as above.

SPECIAL CIRCUMSTANCES

- Cord has to be clamped and cut before placental delivery (for example, for meconium stained liquor, cord round the neck); release blood from placental end into a kidney dish.
- Forceps delivery: repair the episiotomy first and then deliver placenta physiologically. Epidurals necessary: midwife should rest hand on fundus to wait for contraction but should not intervene. Posture will depend on whether the mother can get into a position that allows gravitational force for example, sitting on a bed pan, kneeling with help from partner.
- Placenta retained after one hour: ensure bladder is empty; reattempt physiological delivery with gentle fundal pressure; manage actively – that is, give an oxytocic, clamp cord, and use controlled cord traction; remove placenta manually under general anaesthetic or epidural block.
Interim analysis

After a run in period, which included training of staff in late 1985, the main trial began in January 1986. In April concerns about the high incidence of postpartum haemorrhage in the group allocated to physiological management prompted an early meeting of the data monitoring committee; a preliminary analysis (based on 425 deliveries up to the middle of February 1986) showed that the incidence of postpartum haemorrhage was notably higher in the physiological group (16.5%; 35/212) than the active group (3.8%; 8/213) (odds ratio 4.1; 95% confidence interval 2.2 to 7.6). A disproportionate number of these haemorrhages seemed to have occurred in cases in which physiological management, though randomly allocated, had not been possible – for example, the cord had had to be cut early because it was tightly around the baby's neck or there had been worries about meconium aspiration or the poor condition of the baby at birth. Also, early breastfeeding was reported for only a small proportion of this group, though this might have been because the mother and her baby had been separated to allow paediatric care.

The committee therefore recommended that though there were insufficient data to conclude that active management was preferable, there was sufficient evidence to recommend that the trial protocol should be modified. Accordingly several changes were made to the protocol from May 1986. Three extra criteria for exclusion from the trial were added – namely, ritodrine given within two hours before delivery, anticoagulant treatment given and any condition (known before the envelope was opened) that would necessitate a particular management of the third stage, such as early cutting of the cord if there was meconium in the liquor or a need to avoid maternal effort after a dural tap. In addition, if a woman had been allocated to physiological management but there was a clear need to interrupt this (for example, when the unexpectedly poor condition of the baby necessitated early clamping of the cord) the management thereafter became active. In these circumstances and in the case of exclusions the reasons were carefully documented. The committee also advised staff to renew their attempts to encourage early breastfeeding, particularly in the physiological group.

The data monitoring committee met on three subsequent occasions (July 1986, December 1986, January 1987) to examine additional months’ data and in January 1987 recommended that the trial should be stopped. This recommendation was accepted.

Results

During the period of the main trial (1 January 1986 to 31 January 1987) babies of 4709 women were delivered in the hospital. Table I shows details of the 3014 (64%) women were entered into the trial. The total population in the trial consisted of 1695 women, of whom 849 were randomly allocated to physiological and 846 to active management. Table II shows that the women in the two groups were comparable at entry.
Table III describes the actual management of the third stage of labour and shows a clear separation of the two policies. Virtually all (99%) of the women allocated to active management received this, having a prophylactic oxytocic, cord clamping before placental delivery and cord traction. In contrast only one fifth of the group allocated to physiological management were given a prophylactic oxytocic, two fifths had cord traction and just over half had the cord clamped before the placenta was delivered (and in 32% of those the placental end of the cord was released). In addition, half of this group attempted postures in which gravity could play a part at some time during the third stage and over a quarter put their baby to the breast within the first ten minutes after delivery, compared with 26% and 8% respectively in the group allocated to active management. In terms of use of prophylactic oxytocics, timing of cord clamping, and

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**Table I** — Reasons for not entering 3014 women into trial

<table>
<thead>
<tr>
<th>Reasons for not entering</th>
<th>No of women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women not eligible for reasons specified at start of trial (n=2464)</td>
<td></td>
</tr>
<tr>
<td>Refused to participate</td>
<td>1518</td>
</tr>
<tr>
<td>Cardiac disease</td>
<td>12</td>
</tr>
<tr>
<td>Haemorrhage before delivery</td>
<td>109</td>
</tr>
<tr>
<td>Non-cephalic presentation</td>
<td>97</td>
</tr>
<tr>
<td>Multiple pregnancy</td>
<td>78</td>
</tr>
<tr>
<td>Stillborn</td>
<td>30</td>
</tr>
<tr>
<td>Not expected to deliver vaginally</td>
<td>620</td>
</tr>
<tr>
<td>Women not eligible for additional reasons specified after change in protocol (n=206)</td>
<td></td>
</tr>
<tr>
<td>Rhoimmune treatment given within two hours before delivery</td>
<td>1</td>
</tr>
<tr>
<td>Anticoagulant treatment given</td>
<td>2</td>
</tr>
<tr>
<td>Conditions necessitating particular management:</td>
<td></td>
</tr>
<tr>
<td>Cord cut early to allow neonatal attention</td>
<td>182</td>
</tr>
<tr>
<td>Problems in allowing mother to push—for example, dural tap</td>
<td>21</td>
</tr>
<tr>
<td>Women not entered for other reasons (n=375)</td>
<td></td>
</tr>
<tr>
<td>Maternal medical or obstetric problems</td>
<td>25</td>
</tr>
<tr>
<td>Fetal problems (especially before changes in protocol)</td>
<td>14</td>
</tr>
<tr>
<td>Request of medical staff or midwife</td>
<td>22</td>
</tr>
<tr>
<td>Problems of asking for consent (for example, language difficulties, precipitate delivery)</td>
<td>234</td>
</tr>
<tr>
<td>Administrative error or forgot</td>
<td>80</td>
</tr>
</tbody>
</table>

*For some women there was more than one reason for not entering trial.

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**Table II** — Comparability of groups at entry to trial according to allocation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Physiological management group (n=849)</th>
<th>Active management group (n=846)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sociodemographic variables:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD) maternal age (years)</td>
<td>27.4 (5.1)</td>
<td>27.2 (5.1)</td>
</tr>
<tr>
<td>No married</td>
<td>601</td>
<td>672</td>
</tr>
<tr>
<td>No primiparous</td>
<td>372</td>
<td>409</td>
</tr>
<tr>
<td>Obstetric history:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No with third stage problems previously</td>
<td>47/477</td>
<td>38/437</td>
</tr>
<tr>
<td>Antenatal variables:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No with haemoglobin ≤90 g/l</td>
<td>0/760</td>
<td>2/782</td>
</tr>
<tr>
<td>Mean (SD) haemoglobin (g/l)</td>
<td>117 (9)</td>
<td>117 (9)</td>
</tr>
<tr>
<td>Variables of labour:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No with spontaneous onset</td>
<td>751</td>
<td>717</td>
</tr>
<tr>
<td>No given oxytocin for induction or augmentation</td>
<td>205</td>
<td>232</td>
</tr>
<tr>
<td>No given epidural anaesthetic during 1st or 2nd stage</td>
<td>117/541</td>
<td>95/538</td>
</tr>
<tr>
<td>Mean (SD) length of 1st and 2nd stage (minutes)</td>
<td>277 (222)</td>
<td>281 (214)</td>
</tr>
<tr>
<td>No who had cord clamped before baby delivered</td>
<td>98</td>
<td>115</td>
</tr>
<tr>
<td>No who had spontaneous delivery</td>
<td>743</td>
<td>722</td>
</tr>
<tr>
<td>No who had episiotomy or tear requiring suture</td>
<td>659</td>
<td>659</td>
</tr>
<tr>
<td>No with low risk 1st and 2nd stages of labour*</td>
<td>335/541</td>
<td>340/538</td>
</tr>
<tr>
<td>Baby:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No with gestational age ≤37 weeks</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Mean (SD) gestational age (weeks)</td>
<td>40.1 (11.5)</td>
<td>40.0 (12.2)</td>
</tr>
<tr>
<td>No male</td>
<td>439</td>
<td>447</td>
</tr>
</tbody>
</table>

*Spontaneous onset, no augmentation, no epidural, no labour >12 hours, and spontaneous delivery.
use of cord traction nearly half of the women in the physiological group actually achieved a physiological third stage, compared with only two women in the active group.

Table III — Actual management during third stage of labour in women allocated to physiological or active management

<table>
<thead>
<tr>
<th></th>
<th>Physiological management group (n = 849)</th>
<th>Active management group (n = 846)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophylactic oxytocic given</td>
<td>168</td>
<td>838</td>
</tr>
<tr>
<td>Cord clamped before placental delivery</td>
<td>437</td>
<td>838</td>
</tr>
<tr>
<td>Cord traction</td>
<td>336</td>
<td>839</td>
</tr>
<tr>
<td>Management actually as allocated*</td>
<td>403</td>
<td>840</td>
</tr>
<tr>
<td>If cord clamped before placental delivery, placental end released</td>
<td>138/437</td>
<td>47/838</td>
</tr>
<tr>
<td>Mother adopted posture to use gravity to help</td>
<td>416</td>
<td>217</td>
</tr>
<tr>
<td>Baby put to breast within 10 minutes</td>
<td>225</td>
<td>63</td>
</tr>
</tbody>
</table>

*Physiological = no prophylactic oxytocic given, cord not clamped until after placenta delivered, and no cord traction given; active = prophylactic oxytocic given, cord clamped before placenta delivered, and cord traction given.

The reasons for the differences between the management allocated and that received were elicited from the midwives’ routine data and an examination of case notes by one of us (JH). More than one reason was given in some instances. In the group who were allocated to physiological management but received some active management (n = 446) the reasons were heavy bleeding (95), cord cut before baby delivered (94), meconium (68), resuscitation of baby (59), placenta not delivered after one hour (57), late maternal refusal (30), other (25), and reason not given (15). In the active group there was one late maternal refusal, three other reasons and for two women the reason was not given.

Table IV shows the results in terms of outcome. The incidence of postpartum haemorrhage in the group allocated to active management was 5.9%, which was near the predicted rate of 5%. In the group allocated to physiological management the rate was 17.9%, which was more than double the estimate used in the primary hypotheses to calculate the required sample size with a power of 80%. Thus the odds ratio of such haemorrhage with a policy of physiological rather than active management was 3.13 (95% confidence interval 2.3 to 4.2). This contrast is reflected in the other variables of blood loss shown in Table IV.
The third stage was much longer in the physiological group, lasting more than half an hour in a quarter of the women in this group compared with 3% in the active group (median length 15 vs. 5 minutes), and there was a greater need for therapeutic oxytocics in the physiological group (29.7% vs. 6.4%). There were no significant differences between the groups in the need for manual removal of the placenta or subsequent evacuation of retained products of conception or length of postnatal stay in hospital. In terms of side effects of the oxytocics, women allocated to active management were more likely to suffer from vomiting (12% vs. 7%). Headaches and raised blood pressure were also more common in the active group, but the differences between the groups were not significant.

Apgar scores at one and five minutes were not significantly different between the groups. The mean birth weight of babies in the physiological group was 85 g higher than that of babies in the active group. Staff were more likely to request a blood sample (for indications such as polycythaemia and jaundice) from the babies in the physiological group (166 vs. 127); babies in the physiological group had a higher mean packed cell volume. The difference in the number of admissions to the special care nursery partly reflected the difference in the incidence of neonatal jaundice, but these differences were not significant. There was no difference in the incidence of neonatal respiratory problems between the two groups. Three quarters of the babies in both groups were breastfeeding when they left hospital.
Secondary Analyses

In addition to the primary analyses (Table IV) three further analyses were performed. Firstly, the data were reanalysed separately for the two time periods January to April 1986 inclusive and May 1986 to January 1987 inclusive – that is, before and after the changes in protocol recommended by the data monitoring group. The incidence of postpartum haemorrhage fell from 19% to 17% in the physiological group but rose in the active group from 3% to 7%. The combination of these two changes had the effect of reducing the odds ratio of postpartum haemorrhage associated with physiological as compared with active management over the two time periods from 4.9 (95% confidence interval 3.0 to 8.1) to 2.5 (1.7 to 3.5). This pattern was reflected for all the other variables of maternal blood loss but was less consistent for other variables.

In the next secondary analysis as prespecified in the trial protocol the data were grouped according to whether the first and second stages of labour were considered low risk in relation to the third stage. These stages were defined as low risk if there was spontaneous onset of labour, augmentation and an epidural were unnecessary, labour lasted <12 hours, and delivery was spontaneous. The analysis was based on data obtained after the changes in the protocol as before then information about use of epidurals was not available. The incidence of adverse variables was lower overall in the women defined as having low risk first and second stages. The direction of the effect of the policy of managing the third stage was the same in the groups with low and high risk first and second stages that is, proportionally more adverse variables occurred in the physiological than the active group. If anything, the size of this effect was consistently greater in the women defined as being at low risk – for example, in these women the incidence of postpartum haemorrhage was 16.1% in the physiological group and 4.4% in the active group (odds ratio 3.6; 95% confidence interval 2.2 to 5.9) whereas in the women defined as being at higher risk the incidence was 18.9% in the physiological group and 12.6% in the active group (1.6; 0.9 to 2.7). A similar contrast was seen when any serious complication of the third stage was considered.

The final secondary analysis looked at the women who actually received the management to which they had been allocated. Data on women who received active management in the third stage (nearly all those allocated to it) were compared with data on the 403 women who received physiological management (just under half those allocated to it). Active management was still notably more beneficial in terms of postpartum haemorrhage (odds ratio 2.4; 1.6 to 3.7) and any serious third stage problems, though these contrasts were less strong than those between the groups as randomly allocated. The differences were clearer in terms of the side effects of oxytocics such as vomiting and diastolic blood pressure >100 mm Hg in the labour ward. As most of the babies who needed to be seen by a paediatrician would have had their cords cut early the risk of being admitted to the special care nursery or having a packed cell volume <0.50 was reduced in the babies of women who received physiological management. In contrast, the odds ratio of a packed cell volume >0.65 was increased.

Discussion

In a recent paper Gilbert et al. argued that postpartum haemorrhage is a continuing problem in Britain (12). The three years 1976–1978 saw the highest mortality due to postpartum haemorrhage since the mid-1960s (15). This rate fell again in 1979–1981 (16). The quoted incidences of postpartum haemorrhage vary widely throughout the United Kingdom from, for example, 4% in 1981 in Aberdeen City district (17) to 11% in 1983–1985 in Nether Edge
Hospital, Sheffield (14). The reported national incidence for 1980 was 2% (18). This apparently low rate is probably at least partly because the diagnosis of postpartum haemorrhage is usually based on clinical estimation, which tends to underestimate blood loss (19).

We were concerned that clinical estimates of blood loss might also be subject to systematic bias between the two trial groups as the observer could not be blinded to the management allocated. We therefore studied three maternal haematological variables namely, postpartum (24–48 hours) haemoglobin concentration <90 g/l, mean postpartum packed cell volume, and mean change in haemoglobin concentration between about 34 weeks’ gestation and postpartum. These indirect but objective variables supported the subjective clinical estimates.

Nearly all (95%) the women eligible to participate in the trial did so, and the two groups were comparable at entry. There was a clear separation of management of the third stage between the two groups, with nearly all the women in the active group receiving all three main components of active management (prophylactic oxytocic, early clamping of the cord, and cord traction) compared with about half (n = 403) in the physiological group. We emphasize that this percentage is not a measure of noncompliance in the physiological group; the protocol specified the circumstances in which a deviation from the allocated management was allowed, and the reasons were documented. Rather this percentage may be seen as a measure of the outcome of the policy and these 403 women as the ones who succeeded in achieving a physiological third stage. The final secondary analysis showed, however, that even compared with physiological management in this “successful” group active management was notably more beneficial.

The remainder of the women in the physiological group consisted of those in whom physiological management was not attempted or failed. By considering the use of prophylactic oxytocic, the timing of cord clamping, and use of traction we estimated that about 17% of the women allocated to physiological management actually received as much active management as did those women allocated to active management. Hence the remaining 36% represent the “failure” rate of implementing the policy of physiological management.

This failure may have several causes. It may be related to the categories of women included in the trial. Some people, notably Inch (20) and the National Childbirth Trust (21) have argued against including women whose labour is induced or augmented or who have epidural anaesthetics, prolonged labour in the first or second stages or an instrumental delivery. The results of our second secondary analysis showed that active management of the third stage was preferable regardless of these first and second stage criteria. If anything, and contrary to prior expectations, the advantage of active management was consistently greater in the women defined as being at low risk.

Another contribution to the rate of failure in implementing a physiological third stage may have been the way in which it was managed. This can be divided into four main components. Firstly, though the protocol for physiological management in the trial was established after considerable discussion with several proponents of such management, there is no standard definition of physiological management. Possibly some component of the package used in the trial was not entirely satisfactory.

Secondly, active management was the norm at this hospital before the study and few of the midwives were experienced in carrying out physiological management. One of us (JH) therefore took advice from several midwives known to practise physiological management in the United Kingdom and then trained the midwives working in the delivery suite in this hospital for six
weeks. A pilot study was conducted from November to December 1985 to ensure that the management was feasible. In addition, throughout the trial JH worked in close cooperation with the midwives in the delivery suite.

Thirdly, physiological management may have become less acceptable to the midwives as they became aware that it probably increased the incidence of postpartum haemorrhage and prolonged the length of the third stage. They had however to document their reasons for managing the third stage differently from the way it had been randomly allocated and were also aware that one of us (JH) would be checking all these discrepancies. No reason was given for only 15 of the 446 women whose actual management was not as allocated. The remaining reasons were all legitimate as specified in the trial protocols.

Finally, although all women who were asked to participate in the trial were given a leaflet about possible advantages and disadvantages of active versus physiological management of the third stage of labour, they would almost certainly not have had any antenatal training about it. This may have been more important in the physiological group, in which maternal effort played a greater part.

Thus the main conclusion of the trial is that the policy of active management as practised in this hospital is justified. This is not just in terms of the primary outcome of blood loss greater than 500 ml as this not necessarily dangerous in generally healthy women. The increased risk with physiological management also applied to maternal blood loss greater than 1000 ml, the need for blood transfusions, longer third stages, and a raised neonatal packed cell volume (in those babies who were tested). In contrast physiological management was advantageous only in terms of reducing the incidence of vomiting and neonatal packed cell volumes of less than 0.5. The sample size was not large enough to test the effect on other, rarer problems.

The views of midwives in the labour ward and of a sample of women participating in the trials were also assessed. They are reported fully elsewhere (22) but in summary they provided no evidence to counter the conclusions of the main trial. Depending on the extent to which the obstetric population in the trial and the management policies of this hospital are broadly comparable, these conclusions may be extrapolated to elsewhere in the United Kingdom.

Investigation is needed into some of the components of active management – for instance, to compare different oxytocics (23). Physiological management is the norm in most Third World countries. The role of particular aspects of this management needs to be researched—for instance, the role of early suckling, which is being considered in a trial in Malawi (CHW Bullough, personal communication).

Postpartum haemorrhage is still an important cause of maternal mortality in the Third World. Oxytocics, however, are unstable at high ambient temperatures (24). A study of the feasibility of active management in such settings is needed, followed by a trial of physiological versus active management. The experience of this trial after the changes in protocol (the first secondary analysis) suggests that it is important also to test whether using all aspects of active management rather than adopting a piecemeal approach is preferable. In Bristol inconsistent variations between the two time periods suggest that these may be a result of the smaller numbers in these analyses (616 for January to April and 1079 for May to January) compared with the total trial size of 1695, especially as many of the changes were in the group allocated to active management, in which management had not changed. Possibly some real improvements in outcome occurred in the group allocated to physiological management, perhaps due to the
changes in the protocol or to increased confidence of the midwives. This hypothesis needs to be formally tested in a randomized controlled trial of active versus physiological management of the third stage in a setting in which physiological management is the norm.

We thank the women who took part in the trial; the midwives on the central delivery suite; the obstetricians; Ralph Targett, Hazel Ashurst, and David Jenkins for computing; the data monitoring committee, Ian MacKenzie, Sally Garforth, and Adrian Grant; Colih Bullough, Geoffrey Chamberlain, Peter Dunn, Rick Guidoicti, Sally Inch, Elizabeth Wilson and colleagues at the Department of Health and Social Security; colleagues at the national perinatal epidemiology unit; Philippa Claiden and Frances Potter for typing; South Western Regional Health Authority, for financial support; and the many other people who helped. The maternity and child division at the World Health Organization, Geneva, provided some additional funds. The national perinatal epidemiology unit is supported by the DHSS.

References


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**ONE HUNDRED YEARS AGO**

It is a distressing fact that, while there are a number of homes for female inebriates in England, some of which receive patients without means, there has been practically no provision for destitute male inebriates, or even for those of limited resources. But one attempt at providing for such men has been made, the history of which is before us. Lieutenant-Colonel Whale took a farm at Crowboro about sixteen months ago, and received in all some eleven inmates; six of these were destitute and paid nothing, the others paid ten shillings per week. Unfortunately, the financial support was not sufficient to sustain the undertaking, and the founder has been compelled to close the house, after having expanded £300 beyond the donations, subscriptions, and payments for board received by him. He is now appealing for £500 to enable him to discharge his liabilities and open the farm afresh... It is essential to success to recognize the diseased condition of the inebriate, and to treat him therapeutically with a view to cure. Provided that the bodily and mental affection be attended to, no better adjunct than an industrial farm can be employed. Healthful exercise in the open is an excellent plan to divert into a proper channel that exuberance of spirits and energy which a period of abstinence soon develops in the abstaining inebriate. (*British Medical Journal* 1888;ii:381)
MODULE 16.
INDUCTION OF LABOUR: WHO, WHY AND HOW?

At the end of this module, participants should have:

- understood the power for good and evil provided by the technological advances in methods of induction of labour;
- discussed the validity of several common indications for induction of labour; such a discussion will necessarily include consideration of action to be taken if induction is not performed;
- considered the methods used for induction of labour;
- looked critically at some of the indications for elective Caesarean section.

In this module the issues surrounding the induction of labour are discussed.

The history of induction of labour in many of the supposedly most sophisticated maternity services worldwide is a far from satisfactory one. In the United Kingdom, for example, it is likely that more than 30% of labours were induced in the 1970s. This was neither justified nor fully safe for either mothers or babies. It is for this reason that this module concentrates on assessing the balance of risks versus benefits in either inducing or not inducing labour.

**Indications for induction**

First we consider the indications for induction of labour. These are clearly either maternal or fetal or both. In any discussions of arguments for and against it is necessary to consider actions that would be taken if induction is not performed. Induction of labour can be dangerous for a mother or baby or both. An induction of labour must have an indication.

An indication for induction could be considered almost as a diagnosis. Participants in the course should consider the false positive rates for these diagnoses and what that means in practical terms for mothers and families and, of course, fetuses.

**Maternal indications**

Maternal indications include risks to the health or life of the mother if the pregnancy continues, for example:

- renal disorder
- hypertension
- auto-immune problem
- malignancy
- diabetes
- intrauterine infection
- coagulation problems.

EXERCISE
Discuss whether maternal choice ("social") induction is acceptable or not.
Discuss whether a doctor’s preference (without specific justification) is an acceptable reason for induction.
Note that there are variations in induction rates between doctors, which strongly supports the idea that such inductions occur. Can – and should – we try to reduce these events?

Fetal indications
Fetal indications include a risk to the life or health of the fetus/baby if pregnancy continues, for example:

- maternal diabetes
- intra-uterine fetal growth restriction
- maternal rhesus isoimmunization
- maternal–fetal infection
- (?) prolonged pregnancy
- (?) ruptured membranes.

EXERCISE
Encourage discussion among participants about these indications. Explore whether there is general agreement that induction of labour is an unwarranted intrusion in a normal process unless there are unarguable indications.

Two of the most difficult areas of fetal indications are those of induction for labour in prolonged pregnancies and for spontaneously ruptured membranes at term. Consider the advantages and the disadvantages.

Induction for prolonged pregnancy
There is evidence to suggest that induction of labour after 41 weeks will have a beneficial effect on perinatal mortality. However, this presupposes that the dates have been accurately assessed and that induction with (expensive) prostaglandin is widely available. Note that 500 inductions of labour will be required to prevent one perinatal death. Is this affordable? (The answer will clearly vary between different maternity systems.)

Induction for prolonged ruptured membranes (<24 hours) at or near term
The advantages of induction for prolonged ruptured membranes at or near term are:

- lower risk of maternal uterine infection
- lower risk of intra-uterine infection
- lower risk of baby having to be admitted to a neonatal intensive care unit.

The disadvantages are:

- increased maternal pain and requirement for analgesia
- increased level of fetal monitoring in labour.

Methods used to induce labour
The following methods can be used to induce labour, depending on the state of the cervix:
• membrane sweep and cervical stretch
• artificial rupture of membranes
• oxytocin
• prostaglandins.

_Membrane sweep and cervical stretch_

Membrane sweep and cervical stretch is:
• simple
• of minimal cost
• not very effective (ineffective if the cervix is not favourable).

**Amniotomy**

Amniotomy is:
• simple
• cheap
• requires little technology
• so simple and cheap that it is too tempting and thus easily abused
• vulnerable to the risk of ascending genital tract infection
• vulnerable to the risk of prolapse of umbilical cord, especially hindwater amniotomy.

**Oxytocin**

To induce labour, oxytocin must be given by measured intravenous infusion. There is no role for a bolus dose infusion; this can be extremely dangerous. Oral oxytocin produces unpredictable effects and is not recommended. A recommended regime may be 5 µ of oxytocin in 500 cc of normal saline at 1–2 µ/min, increasing the dose every 15 minutes as required. The suggested maximum doses are 24–36 µ/min.

There are risks of:
• hypertonus resulting in reduced fetal oxygenation
• excessive stimulation resulting in damage to or rupture of the uterus.

**Prostaglandins**

Prostaglandins are administered in the form of a vaginal gel or a suppository. They are:
• expensive
• non-invasive (i.e. no intravenous administration required)
• vulnerable to uncertainty about the best dosage schedule
• once introduced, difficult to retrieve
• contraindicated in asthmatic patients.
EXERCISE
Encourage discussion of the advantages and disadvantages of these methods among participants. Explore whether there is general agreement that induction of labour is an unwarranted intrusion in a normal process unless there are unarguable indications.

The methods used to induce labour are in no way controversial, except that we come up against the paradox that the easier (and cheaper) the technique is, the more likely it is to be overused (and therefore abused).

In summary, the potential complications of induction of labour include:

- uterine hyper-stimulation/uterine rupture
- postpartum haemorrhage induced by uterine hypotonus (after a long and difficult labour)
- fetal distress: **fetal monitoring is mandatory**
- umbilical cord prolapse
- abruptio placentae
- iatrogenic prematurity
- hyponatraemia secondary to excessive oxytocin infusion
- infection.

EXERCISE
Debate whether induction of labour is appropriate, necessary and/or safe in three particular pregnancy situations: breech presentation, previous Caesarean section and twins (or higher multiple pregnancies).

To conclude this module, consider the issue of elective (planned) Caesarean section. The rates of elective Caesarean section differ enormously between countries and (predictably) between individual obstetricians. This reflects the fact that nobody knows for sure what the correct rate for Caesarean sections should be. As a guideline, WHO suggests that it should range between 5% and 15% with the higher rates occurring at referral, tertiary level centres.

With the assistance of the course leader, participants should debate some of the commonly cited indications for elective Caesarean section, including:

- previous Caesarean section for recurrent indication
- antepartum “confirmed” disproportion
- antepartum fetal distress
- placenta praevia
- fetal disease
- maternal disease
- multiple pregnancy
- transverse lie or other malpresentation.
The risk in elective Caesarean section is less than that in an emergency Caesarean section. The risk to the mother in any type of Caesarean section is greater than that in vaginal delivery (with a few exceptions such as placenta praevia, gross disproportion). Participants should have a thorough understanding of the risks and benefits of vaginal birth after Caesarean section.
At the end of this module participants will be able to:

- understand the mechanisms underlying postpartum haemorrhage
- understand the diagnostic steps to identify and efficiently manage postpartum haemorrhage.

**Definitions**

*Postpartum haemorrhage (PPH)* is a loss of 500 ml of blood or more from the genital tract after the delivery of the baby.

Note: It is important to remember that a lower level of blood loss can cause the woman’s condition to deteriorate in certain circumstances. This will include the presence of physiologically significant anaemia or other medical conditions such as cardiac disease. Participants in the workshop should know the importance of special prophylactic measures and use of earlier therapeutic measures in such cases.

*Primary postpartum haemorrhage* includes all occurrences of PPH within 24 hours after delivery.

*Secondary postpartum haemorrhage* includes all cases of PPH occurring between 24 hours and six weeks postpartum.

*Retained placenta* describes the situation when the placenta is wholly or partially retained. The uterus is unable to contract adequately and thus the blood vessels are not compressed and bleeding is not controlled. Any condition that interferes with uterine contractions, such as retained placenta, will predispose to atonic PPH.

*Avoidable factors* are factors causing or contributing to maternal death where there is departure from generally accepted standards of care.

*Risk factors* are factors which make a condition more likely to happen or more dangerous.

*Direct obstetric death* is a death resulting from obstetric complications of the pregnant state (i.e. pregnancy, labour, puerperium) following interventions, omissions or incorrect treatment or from a chain of events resulting from any of the foregoing.

*Indirect obstetric death* is a death resulting from a previously existing disease or a disease which developed during pregnancy and which was not due to direct obstetric causes but which was aggravated (or made worse) by the physiological effects of pregnancy.

**The main causes of PPH**

The causes of PPH can be discussed for convenience under two headings: primary PPH and secondary PPH.
Primary PPH

The causes of primary PPH include:

- atonic uterus (due, for example, to retained placenta or membranes);
- genital trauma (including both spontaneous trauma and trauma caused by treatment or interference, e.g. instrumental delivery including Caesarean section, episiotomy);
- primary haematological disorders (e.g. von Willebrand’s or other clotting factor deficiency);
- disseminated intravascular coagulation (rare);
- inversion of the uterus (rare).

The last two causes are associated with a high incidence of maternal death.

Secondary PPH

The causes of secondary PPH are:

- retained fragments of placenta or membranes;
- shedding of dead tissues following obstructed labour (this may involve cervix, bladder, rectum);
- breakdown of uterine wound (after Caesarean section or ruptured uterus).

Secondary PPH can occur at any time from 24 hours after delivery up to the sixth postnatal week, but the most common time is between 7 and 12 days after delivery.

Why is PPH such a problem?

Postpartum haemorrhage can be a very serious emergency. The condition of the mother can deteriorate alarmingly in a matter of seconds. Because haemorrhage can follow the most normal of deliveries, midwives and other health professionals must be prepared both to diagnose and to expedite treatment without sophisticated medical aids. Prompt treatment may be lifesaving. PPH remains one of the most common causes of maternal death in all countries. Deaths usually occur as a result of lack of appropriate care and skills in recognizing the signs of haemorrhage and failure to take prompt and appropriate action.

EXERCISE

Discuss the effects of severe blood loss on the body. Make a list of these effects and be prepared to share it with the rest of the group.

Effects of severe blood loss on the body

Women can lose up to 500 ml of blood in one minute. The effects of severe blood loss are:

- general effects of loss of blood in the circulation:
  - ex-sanguination will occur in ten minutes (the average woman has five litres in circulation).
- effects on vital organs:
  - kidneys: renal shutdown and cortical necrosis
  - lungs: air hunger
  - brain: loss of consciousness, nausea, pituitary damage.
But remember women who are not in good health may suffer other effects.

GROUP WORK
Discuss what effect PPH will have on women who are not in good health, and particularly:
- those with anaemia
- those with chronic ill health, such as malaria, tuberculosis or hookworm.

Be prepared to share your answers with the whole group.

Feedback should include the fact that anaemia will cause the woman to be listless and tired and less able to look after herself, lactate and feed her baby and look after the rest of the family. This may lead to a chronic anaemic condition which may ultimately affect the whole family. She may also be prone to infections in the future.

The long-term effects of severe blood loss include Sheehan’s syndrome, caused by hypovolaemia, which causes necrosis of the pituitary gland. This condition affects endocrine function and there will be failure of lactation and premature ageing.

It is important to remember:
- the importance of treating PPH
- that prompt and correct treatment can save lives.

Prevention of PPH

Avoidable factors in prevention of PPH

GROUP WORK
Discuss the factors associated with PPH which you believe to be avoidable. Make a list of these avoidable factors, confirming how they can be avoided. Be prepared to share your list with the rest of the group.

A list drawn up in this exercise should include the following:
- severe anaemia, which is a major factor in contributing to death; anaemia should have been corrected antenatally and is therefore potentially avoidable;
- women with high parity need constant vigilance and care in the third stage as they are known to be predisposed to atonic uterus;
- women with a previous history of haemorrhage or retained placenta are at risk; their delivery should be in a safe environment.

Factors which place women at increased risk of PPH

Midwives must be aware that certain women are at increased risk of PPH. These risks are divided into three groups: those which predate the existing pregnancy; those that arise during the pregnancy; and those that arise during labour (Table 17.1).
Table 17.1 Factors placing the woman at increased risk

<table>
<thead>
<tr>
<th>Predating present pregnancy</th>
<th>Arising during present pregnancy</th>
<th>Arising during labour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primigravida</td>
<td>Placenta praevia</td>
<td>Induced labour</td>
</tr>
<tr>
<td>High parity (5+)</td>
<td>Abruptio placenta</td>
<td>Prolonged/obstructed labour</td>
</tr>
<tr>
<td>Fibroids</td>
<td>Polyhydramnios</td>
<td>Precipitate labour</td>
</tr>
<tr>
<td>Previous retained placenta, previous PPH</td>
<td>Multiple pregnancy</td>
<td>Forceps delivery</td>
</tr>
<tr>
<td>Previous surgery to the uterus including previous Caesarean section</td>
<td>Intraterine death</td>
<td>Caesarean section</td>
</tr>
<tr>
<td>Previous prolonged/obstructed labour</td>
<td>Eclampsia</td>
<td>General/epidural anaesthesia</td>
</tr>
<tr>
<td>Pre-existing disease (cardiac disease, diabetes, clotting defects)</td>
<td>Hepatitis</td>
<td>Chorio-amnionitis</td>
</tr>
<tr>
<td>Anaemia</td>
<td>Any condition associated with anaemia (e.g. malaria, hookworm)</td>
<td>Disseminated intravascular coagulation</td>
</tr>
</tbody>
</table>

**Avoidable factors – the role of the midwife**

Risk factors for PPH can be influenced by community education, and the care giver or midwife has an important role in this. She should educate community members about the danger of PPH, the risk factors and the importance of antenatal care. She could also get involved in setting up emergency plans with village traditional birthing attendants/auxiliaries to deal with haemorrhage.

It is important that participants in the workshop realize that PPH is usually preventable. Avoidable factors must be recognized so that action can be taken, such as giving an oxytocic drug.

Not all causes of PPH are avoidable. The major causes are:
- atonic uterus
- genital trauma.

There are other causes but they occur less frequently.

**Recognition of PPH**

The management of PPH depends on the cause. However, the main priority of management is to recognize that haemorrhage is occurring and institute prompt action. It is **vital** that all midwives promptly recognize the signs of hypovolaemic (reduced blood volume) shock.

**Recognition and treatment of hypovolaemic shock**

It is vital that everyone concerned with women in labour is able to recognize the signs of hypovolaemic shock as not all causes of haemorrhage in labour can be predicted (Table 17.2).

Table 17.2 Hypovolaemic shock

<table>
<thead>
<tr>
<th>Early hypovolaemic shock</th>
<th>Late hypovolaemic shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awake, aware, anxious</td>
<td>Confused or unconscious</td>
</tr>
<tr>
<td>Feeble and fast pulse (110 per minute or more)</td>
<td>Very fast and weak pulse</td>
</tr>
<tr>
<td>Slightly fast breathing (30 respirations per minute or more)</td>
<td>Extremely fast and shallow breathing</td>
</tr>
<tr>
<td>Pale</td>
<td>Pale and cold</td>
</tr>
<tr>
<td>Relatively low blood pressure (systolic less than 90 mmHg)</td>
<td>Very low blood pressure (systolic less than 60 mmHg)</td>
</tr>
<tr>
<td>Reduced urine output, but &gt;30cc per hour</td>
<td>Urine output &lt;30cc per hour</td>
</tr>
</tbody>
</table>
Good management of hypovolaemic shock is essential if the woman is to survive. The principles of management must be remembered and include:

- **VITAL:** summon medical assistance
- position the woman in the recovery position: head down
- ensure her airway is open
- replace fluids by the intravenous route
- catheterize her bladder so as to monitor urinary output
- **ESSENTIAL:** refer and transfer her to a major obstetric unit as fast as possible.

It is also important that caregivers and midwives can recognize and take some action to treat the cause of the bleeding. This is particularly important for those working in community areas or where there is little medical assistance.

**Recognition of primary PPH**

Bleeding can occur at any time from the birth of the baby up to 24 hours after delivery. A warning sign is that the uterus is not well contracted. Sometimes the bleeding is not entirely visible, in which case the uterus will feel bulky and the fundus will be higher than normal and rising. In these cases signs of hypovolaemic shock may be the first indications of a problem.

**Recognition of secondary PPH**

Secondary PPH is bleeding from the genital tract, in excess of that expected from normal lochia, after 24 hours and during the first six weeks following delivery. The uterus does not involute properly. Puerperal sepsis makes the danger of secondary PPH greater.

Signs of infection may include:

- offensive lochia
- fever
- tachycardia.

**Treatment of PPH**

The midwife should know how to treat this condition because, as stated above, speed is the essential factor in saving the woman’s life.

**Treatment of primary PPH**

The principles of treating primary PPH are:

- speed/timeliness
- skills needed
- priorities.

The six priorities in treatment are:

- call for help (to assist in controlling the bleeding)
- assess the patient’s condition
• find the cause of the bleeding
• stop the bleeding
• stabilize or resuscitate the woman
• prevent further bleeding.

These are priorities: this means that they must be done first or before anything else. In order to do those things which are most important, it is often necessary to:
• change the order of what is usually done
• identify what must be done in order to save life.

Example:
It is usual to examine a woman from head to toe. If she has already lost >500 ml (by definition PPH) when you are called to her, you need to assess quickly her general colour, pulse, blood pressure and level of consciousness, estimate how much blood she has already lost and immediately feel her uterus to determine if it is atonic. This can be done in a few seconds. Further detailed examination can be carried out later and would waste time now.

The woman will die unless:
• the bleeding is stopped;
• she is resuscitated or her condition is stabilized, which involves maintaining blood volume and treating shock.

The exact management will, however, depend on whether the placenta is delivered or not.

A. Management of PPH with the placenta delivered

Call for another health care professional, if one is available. If not, ask a person who is culturally acceptable to the community and family to help you stop the bleeding.

In order to stop the bleeding it is essential to empty the uterus and make it contract.

Treatment Protocol

1. Massage the uterus firmly to help it contract and expel any clots.
2. Take blood for determination of the blood group, cross-matching and haemoglobin estimation (identify potential donors if there is no blood bank) and set up an intravenous drip. Use normal saline or Ringer’s Lactate initially and, if the woman is in shock, run it fast (1 litre in 15 minutes) until she stabilizes (you may need to infuse up to 3 litres to correct the shock). Use plasma expander if available.
3. Assess the patient’s condition (pulse, blood pressure, colour, consciousness and uterine tone) and estimate how much blood has already been lost. If the woman is in shock, make sure that the airway is open, turn her head to the side, and give her oxygen, if available, at 6–8 litres per minute by mask or nasal cannulae.
4. Give uterotonics, i.e. ergometrine (0.5 mg) or methergine (methylergometrine) (IV or IM) or oxytocin (10–20 units IM or IV).
5. Empty the woman’s bladder and keep it empty. Insert a catheter if the woman is unable to use a bedpan.

6. Check that the placenta and membranes are complete. If retained bits of placenta are suspected, the women will need curettage of the uterus to remove them.

7. Keep the uterus well contracted. Try putting the baby to the breast or use nipple stimulation if the baby will not suckle. (If in hospital add 40 units of oxytocin to 1 litre and run it at 40 drops per minute; you may need to set up a second intravenous drip.)

8. If the bleeding persists and the uterus keeps relaxing, use bimanual compression (external and/or internal bimanual compression) while the woman is transferred to a major unit.

9. If the bleeding persists and the uterus is well contracted, examine the vagina and cervix for lacerations which are bleeding.

10. In cases of severe shock use plasma expanders or blood transfusion, if available.

11. If there are any indications that infection may be present, including fever, chills or foul-smelling vaginal discharge, start broad-spectrum antibiotics.

12. Keep accurate records.

Signs that the woman is stabilizing include rising blood pressure (aim for a systolic blood pressure of at least 100 mmHg) and a reducing heart rate (aim for a pulse under 90).

**External bimanual compression**

1. Place the left hand on the fundus and make it go down as far as possible behind the uterus.
2. Place the right hand on the abdomen between the umbilicus and the symphysis pubis.
3. Press the hands towards each other so as to compress the blood vessels at the placental site.

**Internal bimanual compression**

Internal bimanual compression is advisable in the following circumstances:

- severe haemorrhage if external compression is not effective
- if bleeding persists after manual removal of the placenta
- sometimes in case of anaesthesia.

**Procedure for internal bimanual compression of the uterus**

1. Scrub your hands and use sterile gloves.
2. Place your left hand on the fundus as in external bimanual compression. Gently introduce your right hand into the vagina and make it into a fist. Exert pressure by the left hand downwards and the right hand (fist) directed towards the anterior fornix of the vagina. This maintains the uterus well contracted and empty and prevents further bleeding, encouraging haemostasis to occur. You will need to maintain this procedure until skilled assistance arrives or during transfer of the patient to a suitably equipped unit, where skilled staff are available.

**Manual compression of the aorta**

Manual compression of the aorta should only be used in very severe haemorrhage, and only if internal compression of the uterus has not been effective.
Two hands are used, one held in the groin to check for femoral artery pulse and the other fist held over the umbilicus and slowly lowered towards the anterior side of the vertebral column. When the femoral arterial pulsation stops, the aortic compression is sufficient and the bleeding will stop.

B. Management of PPH with the placenta retained

The principles of treatment are the same as in cases where the placenta is delivered.

In order to stop the bleeding it is essential to make sure that the uterus is contracted and empty. It may be necessary to remove the placenta manually (Figure 17.1).

Figure 17.1 Manual removal of the placenta
Treatment Protocol

1. Assess the patient’s condition (pulse, blood pressure, general colour, consciousness and uterine tone) and estimate how much blood has already been lost. If the woman is in hypovolaemic shock, make sure her airway is open, turn her head to the side and give her oxygen if available at 6–8 litres per minute by mask or nasal cannulae.

2. Give uterotonics, i.e. ergometrine (0.5 mg) or methergine IV or IM or oxytocin (10–20 units IM or IV).

3. Take blood for determination of the blood group, cross-matching and estimating the haemoglobin and set up an intravenous infusion (IVI). Use normal saline or Ringer’s lactate initially or plasma expander, if available, and if the woman is in shock, run it fast (1 litre in 15 minutes) until the woman stabilizes (you may need to infuse up to 3 litres to correct the shock).

4. Empty the bladder and attempt controlled cord traction to deliver the placenta. If this is successful, examine the placenta to ensure it is complete. Keep the uterus contracted by massage of the fundus. Put the baby to the breast or use nipple stimulation if the baby will not suck. (If in hospital, put 40 units of oxytocin in 1 litre of normal saline and run it at 40 drops per minute. You may need to set up a second intravenous drip.) If controlled cord traction is not successful, a gentle vaginal examination should be performed. If the placenta can be felt protruding through the cervix, it should be grasped with the fingers and steadily withdrawn from the uterus, which should be supported through the abdominal wall by the other hand.

5. Excessive traction may lead to uterine inversion, a potentially (even more) life-threatening event.

6. If the placenta cannot be delivered, the placenta should be removed manually after the patient has been given plasma expanders or blood if needed. After manual removal of the placenta has been carried out, give 0.5 mg ergometrine or methergyn IM or IV and massage the uterus. A broad-spectrum antibiotic should be commenced as soon as possible. (Manual removal will usually only be possible under general anaesthetic.)


Signs that the woman is stabilizing include:

- a rising blood pressure (aim for a systolic blood pressure of at least 100 mm Hg)
- a stabilizing and reducing heart rate (aim for a pulse under 90).

Table 17.3 shows the appropriate care to be taken of a woman with PPH and retained placenta who has to be referred and transferred to a higher level maternity centre.
Table 17.3 Appropriate care during referral and transfer (to a higher maternity centre) of a patient with PPH and retained placenta

<table>
<thead>
<tr>
<th>Maintain</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraction of uterus</td>
<td>Repeat oxytocin (IV or IM) if necessary</td>
</tr>
<tr>
<td>Empty bladder</td>
<td>Self-retaining catheter</td>
</tr>
<tr>
<td>Blood volume</td>
<td>IV fluids, plasma expanders (oral fluids if IV fluids are not available and the patient is not in shock)</td>
</tr>
<tr>
<td>Protection from infection</td>
<td>Broad spectrum antibiotic (e.g. ampicillin 1 g IM)</td>
</tr>
<tr>
<td>Observations of condition</td>
<td>Eyes to check colour, pulse, blood pressure, blood loss, level of consciousness to assess loss</td>
</tr>
<tr>
<td>Warmth of the patient</td>
<td>Blankets</td>
</tr>
<tr>
<td>Accurate records</td>
<td>Charts and notes</td>
</tr>
<tr>
<td>Relatives prepared to give blood should accompany the patient</td>
<td></td>
</tr>
</tbody>
</table>

**Treatment of secondary PPH**

The same principles apply as in treating primary PPH:

- speed/timeliness
- skill
- priorities.

**Priorities in treating secondary PPH**

The priorities in treating secondary PPH are similar to those in treating primary PPH, but the woman will usually be at home.

1. Admit the woman to hospital urgently or – if necessary – as an emergency.
2. Assess her condition and, if in a remote area, start treatment if possible before transfer.
3. Give ergometrine 0.5 mg or methergyn IM or IV (where there is no contraindication).
4. Take blood for haemoglobin check, blood grouping and cross-matching.
5. Put up an IV. Use normal saline or Ringer’s lactate initially, or plasma expander if available. If the woman is in shock, run it fast (1 litre in 15 minutes) until she stabilizes (you may need to infuse up to 3 litres to correct the shock).
6. If bleeding is severe, add 40 units oxytocin per litre to the IV and run it at 40 drops per minute (the health care provider may need to set up a second IV line).
7. In cases of severe shock use plasma expanders or blood transfusion if available.
8. Start broad-spectrum antibiotics in high doses. Useful regimens are:
   - Penicillin 5 mega-units IV stat followed by 2 mega-units every six hours + Gentamicin 100 mg stat IM followed by 80 mg every eight hours + Metronidazole 500 mg orally every six hours;
   - **or:** Ampicillin 1 gm IV stat followed by 500 mg IM every six hours + Metronidazole 500 mg orally every six hours;
   - **or:** Penicillin 5 mega-units IV stat followed by 2 mega-units every six hours + Gentamicin 100 mg state IM followed by 80 mg every eight hours or Penicillin 5 mega-units IV stat followed by 2 mega-units every 6 hours plus Clindamycin 500 mg IV every six hours;
9. If possible, prepare the patient for immediate examination under anaesthetic.

**Examination**

A trained health care professional will:
- gently explore the uterus
- remove any shedding tissue
- resuture genital wounds if necessary
- monitor the patient’s condition very carefully, including:
  - temperature
  - pulse
  - respiration
  - blood pressure
  - blood loss
  - general condition (e.g. colour, level of consciousness)
  - fluid intake and urinary output
  - keeping accurate records;
- provide good nursing care, which includes:
  - physical comfort and hygiene
  - emotional support
  - carrying out medical instructions
  - reporting any changes to the doctor.

**Treatment of traumatic PPH**

Traumatic PPH is dealt with under a separate heading, as the recognition and treatment of the condition varies slightly from the above, although the same principles regarding blood loss and shock apply.

**Treatment Protocol**

1. Take blood for blood group, cross-matching and haemoglobin estimation.
2. Set up an IV, give saline or Ringer’s lactate followed by plasma expanders if available and if shock is severe.
3. Place the woman in the lithotomy position and use good lighting.
4. Find the bleeding point if visible and clamp it.
5. Estimate the blood loss.
6. Check pulse and blood pressure, and observe general condition.
7. Suture the tear.
8. Start the woman on a broad spectrum antibiotic such as ampicillin 1 g stat orally followed by 500 mg every six hours for five days (in severe cases, if necessary).

**Role of the midwife or care giver in PPH**

Treat the shock, stabilize the condition, instigate emergency procedures and seek medical assistance. This may mean transferring the woman to a medical facility where more advanced procedures can be given. However, it is the midwife’s responsibility to ensure wherever possible that she accompanies the woman to the facility to provide appropriate care during the transfer (Table 17.4).

<table>
<thead>
<tr>
<th>Maintain</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraction of uterus</td>
<td>Massage</td>
</tr>
<tr>
<td></td>
<td>Bimanual compression of the uterus</td>
</tr>
<tr>
<td></td>
<td>Repeat oxytocic (IV or IM) if necessary</td>
</tr>
<tr>
<td>Empty bladder</td>
<td>Self-retaining catheter</td>
</tr>
<tr>
<td>Blood volume</td>
<td>IV fluids, plasma expanders (oral fluids if IV fluids are not available and the patient is not in shock)</td>
</tr>
<tr>
<td>Observations of condition</td>
<td>Eyes to check colour, pulse, blood pressure, blood loss, level of consciousness to assess loss</td>
</tr>
<tr>
<td>Warmth of the patient</td>
<td>Blankets</td>
</tr>
<tr>
<td>Accurate records</td>
<td>Charts and notes</td>
</tr>
<tr>
<td>Contact with relatives who will act as donors (relatives should accompany patient)</td>
<td></td>
</tr>
</tbody>
</table>

Remember:
- never leave the patient alone until bleeding is controlled and her general condition is good;
- in atonic PPH, never insert a vaginal pack;
- if you are in a home or health centre without the necessary skills and/or facilities, you should arrange referral to hospital if:
  - the patient is shocked
  - the bleeding is not controlled
  - the patient needs a curettage for retained bits of placenta;
- use the quickest available means of transport.

**Continuing Treatment Protocol**

If bleeding has been arrested it is important to monitor the patient’s condition carefully over the next 24–48 hours. Observations include:
- checking that the uterus is firm and well contracted;
- estimating blood loss (in order to estimate bleeding accurately, put a sanitary napkin or other clean material under the woman’s buttocks and ask her to extend her legs and cross them at the ankles for about 20–30 minutes: the blood will then collect in the area of the pubic triangle);
- temperature;
• pulse;
• respiration;
• blood pressure;
• general condition (e.g. colour, level of consciousness);
• fluid intake (after the woman has stabilized, IV fluids should be given at a rate of 1 litre in 6–8 hours);
• blood transfusion should be monitored and the volume transfused recorded as part of the fluid intake;
• urinary output;
• keeping accurate records.

**REMEMBER THAT DELAY MAY MEAN DEATH**

Before the woman goes home, her haemoglobin should be checked, and iron supplementation should be given if indicated (because blood loss leads to depletion of iron stores in the body).

**EXERCISE**

What is the quickest means of transport to the medical facility in your area?
What is the longest time you have waited for any transport to take you to the facility?
Have you ever had to transfer a woman in the community to the medical facility for any reason?
What was the outcome when you had to wait?
What would the outcome have been if the woman had been severely shocked and suffering from PPH?
What could you do to ensure that transfer could occur speedily in such emergencies?
What protocols do you have in place to deal with a severe PPH?
Be prepared to feed your answers back to the main group.

Remember to provide as much emotional support as well as information to the woman and/or to her accompanying family members as is possible under the circumstances.

**Obstetric Haemorrhage Protocol: Community Maternity Units**

**Administration**

1. **Contact:**
   • ambulance service to organize emergency transfer
   • telephone ahead to referral hospital
     – patient’s details
     – estimated blood loss
     – patient’s blood group
2. **Organize midwife or MD escort**
3. Collect:
   - four bottles of plasma expander
   - two litres of Hartmann’s or normal saline
   - two ampoules of ergometrine 500 micrograms
   - syntocinon 80 IU.

4. Resuscitate:
   - left lateral position and elevate legs
   - give oxygen
   - insert at least two large bore (14 gauge) IV cannulae.

5. Stop the bleeding (if PPH):
   - give Ergometrine 0.5 mg intravenously – caution if pre-eclampsia
   - Oxytocin infusion 40 units in 500 ml normal saline over 4 hours;
   - perform bimanual compression.

6. Give the following fluids RAPIDLY as clinically indicated [AVOID TOO LITTLE TOO LATE]:
   - Hartmann’s or isotonic saline
   - Plasma expander.

In cases of retained placenta

7. In all cases:
   - insert 16 g IV catheter
   - run in 500 ml Hartmann’s or isotonic solution.

8. If the patient is bleeding actively:
   - follow the protocol for obstetric haemorrhage.

Management of intermediate PPH

Definition: Blood loss 500–1000 ml and continuing
No hypotension or tachycardia

1. Initial action:
   - continue regular monitoring of pulse and blood pressure
   - palpate uterus
     - size and consistency
     - rub up contraction if necessary
   - vaginal examination
     - remove clot from cervix and vagina
Module 17. Postpartum Haemorrhage

- give one ampoule syntometrine (in addition to that given at delivery)
- check placenta: is it complete?

2. Observe for ten minutes
- if bleeding ceases, situation is resolved, but continue regular observation of pulse, blood pressure and PV loss

3. Action for continued bleeding
- [if in community hospital transfer to level II with IV access where possible + 40 IU syntocinon in 500 ml normal saline over 1–2 hours or faster if necessary];
- call obstetric resident staff in level II facility;
- cross-match two units minimum;
- IV fluids including 40 IU syntocinon in 500 ml normal saline;
- perform vaginal examination, including visualization of cervix if possible.

4. Situation still not resolved
- consider further oxytocics – ergometrine/hemabate
- arrange examination under anaesthetic
- inform senior obstetrician on call
- call anaesthetist
- organize operating theatre.

**Obstetric haemorrhage protocol: for use in obstetric department**

**Administration**

1. Summon the emergency obstetric team:
- obstetric registrar
- anaesthetic registrar
- obstetric consultant
- anaesthetic consultant
- porter/theatre runner.

2. Contact blood bank
- ask for “six units type specific blood as soon as possible”
- tell them patient’s blood group.

3. Contact operating theatre
- warn of pending emergency.

4. Assign one midwife to keep records of:
- the mother’s pulse
- blood pressure
the mother’s heart rate (via ECG)
- fetal heart rate (in the case of antepartum haemorrhage)
- central venous pressure
- urine output
- amount and type of fluids administered
- dose and type of drugs administered.

5. Assign one person (runner) to:
- take blood specimens to transfusion centre
- bring blood and blood products back from transfusion centre
- one midwife to check placenta and to see if complete.

Procedure

6. Resuscitate
- left lateral position and elevate legs
- give oxygen
- insert at least 2 large bore (14 gauge) IV cannulae.

7. Take blood
- 20 ml for cross-matching at least 6 units of blood
- for Fibrin split products, platelets, prothrombin time.

8. Stop the bleeding (if PPH)
- give: Ergometrine 0.5 mg intravenously – caution if pre-eclampsia. Syntocinon infusion 40 units in 500 ml normal saline over 4 hours.

If needed proceed to:
- perform: bimanual compression.

If needed proceed to:
- give: Carboprost (Hemabate) injection 0.25 mg IM or directly trans-abdominally into the uterine body.

9. Give the following fluids RAPIDLY as clinically indicated [AVOID TOO LITTLE TOO LATE]:
- Hartmann’s or isotonic saline
- Haemaccel or other plasma expanders
- Type specific blood – full cross match to be telephoned through
- Cross-matched blood as soon as available
- O Rh negative blood (not cross-matched) – if other blood not available.
Consider (on advice from haematologist):
- Fresh frozen plasma/cryoprecipitate – give two units fresh frozen plasma if blood loss >50% blood volume;
- Platelet infusion;
- Use compression cuffs on plastic bag containers;
- Do not bother with blood filters but use blood-giving set;
- Use blood warmers where available.

10. Take to theatre (if PPH) for:
- examination under anaesthetic:
  - check for genital tract tears
  - check that uterine cavity is empty.
- pack the uterus.

Consider:
- vessel embolization by radiologists
- ligation of both internal iliac arteries
- hysterectomy to ligate active bleeders
- hysterectomy.

11. Insert central venous line to monitor fluid replacement
- get CVP monitor from main operating theatre
- apply ECG monitor.
MODULE 18.
CARE OF THE BABY AT BIRTH AND RESUSCITATION

At the end of this module the participants should be able to:

- prepare for the care of a newborn
- care for the normal newborn
- resuscitate a newborn with asphyxia.

Reading:
Birth asphyxia.

Care of the healthy newborn

The procedures illustrated in this session should be performed for all births and newborn babies.

Delivery in a maternity unit

Preparation

Careful preparation of the delivery area and provision of suitable equipment are important for the health of the newborn at birth.

The following should always be provided in a maternity unit:

- a resuscitation table with a manually controlled overhead heater;
- resuscitation equipment (infant face mask, ventilating bag);
- cord-cutting/cord-clamping kit;
- suction apparatus;
- suction catheters;
- infant thermometers reading down to 25°C (77°F) – an ordinary thermometer only reads down to 35°C (95°F) and will not detect significant hypothermia;
- baby weighing scale;
- heat source to warm the delivery room;
- blanket (to wrap the infant);
- air-heated incubators or water-filled mattresses to warm the infant (for internal or external transport).

The following principles of cleanliness should be carefully observed:

- clean hands (in health facilities, sterile gloves)
- clean perineum
- clean delivery surface
- nothing unclean to be introduced into the vagina
- cleanliness in dividing the umbilical cord and taking care of the newborn baby
• instruments, gauze and ties used for delivery and cord care should be sterile
• nothing should be applied either to the cutting surface or to the stump
• the stump should be left uncovered to dry and mummify.

**Drying the infant**

The evaporative heat loss from the skin results in a lowering of skin temperature within seconds of birth. This is the most intense of the sensory stimuli provoking spontaneous breathing at birth. This heat loss is both physiological and impossible to avoid, but if cooling continues in the minutes that follow, the body temperature will drop below 36°C and hypothermia will occur. Thus immediate drying of the baby is necessary. It is also important to change the first wet towel to a dry one.

**Assessing the infant**

As soon as the infant is born and while drying him/her, the health professional should immediately assess the wellbeing of the child in order to identify an infant that requires special care and a healthy infant that can be given immediately to the mother (Figure 18.1).

**Figure 18.1 Assessment, classification and management of the newborn**

1. Dry the baby
2. Give the baby to the mother

**Assessment**

<table>
<thead>
<tr>
<th>Breathing: Normal</th>
<th>Irregular or absent</th>
<th>Heart rate: Hr &gt;100/min</th>
<th>Hr &lt;100/min</th>
<th>Hr &gt;100/min</th>
<th>Hr &gt;100/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate:</td>
<td></td>
<td>Hr &gt;100/min</td>
<td>Hr &lt;100/min</td>
<td>Hr &gt;100/min</td>
<td>Hr &gt;100/min</td>
</tr>
<tr>
<td>Weight/</td>
<td>Bw &gt;2500/</td>
<td>Bw &lt;2500/</td>
<td>Bw &lt;2500/</td>
<td>Bw &lt;2500/</td>
<td>Bw &lt;2500/</td>
</tr>
<tr>
<td>gestational age:</td>
<td>&gt;37 weeks</td>
<td>&gt;37 weeks</td>
<td>&gt;37 weeks</td>
<td>&gt;37 weeks</td>
<td>&gt;37 weeks</td>
</tr>
<tr>
<td>Birth defect/</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Present (specify)</td>
</tr>
<tr>
<td>birth trauma:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Classification**

<table>
<thead>
<tr>
<th>Healthy infant</th>
<th>Asphyxia</th>
<th>Low birth weight</th>
<th>Birth defect/birth trauma</th>
</tr>
</thead>
</table>

**Management**

| Care of a healthy newborn | Care of the asphyctic newborn | Care of the low-birth-weight infant | Care of the infant with birth defect/birth trauma |

The assessment of the infant is made by looking for:

- *spontaneous breathing and heart rate* in order to identify babies who need immediate resuscitation; this is the most important thing and must be done within 30 seconds from delivery;
- *birth weight/gestational age* in order to identify a low-birth-weight/preterm infant who needs special care;
- *birth defects/birth trauma* in order to ensure appropriate and adequate treatment as soon as possible.
Definitions

Breathing: normal breathing of an infant means initiation of spontaneous breathing within 30 seconds after delivery.

Heart rate: a heart rate (HR) of >100 per minute is considered acceptable at birth and should be well over 120 per minute after the first few minutes.

Birth weight: the first weight of the newborn baby obtained after birth. This weight should be measured preferably within the first hours of life.

Gestational age: the duration of gestation is measured from the first day of the last normal menstrual period. Gestational age is expressed in completed days or weeks. An at-term delivery occurs from after 37 to less than 42 completed weeks of gestation (259–293 days). This information should be available before birth.

Give the baby to the mother

Every birth attendant should know that a newborn baby is a person with neurosensory behaviour; the capability to see, feel (pain, warmth, cold), smell, taste and cry out (happily or unhappily). With this in mind we should treat every newborn baby as a human being.

The baby should be delivered onto the mother’s abdomen and dried in this position. The mother can be encouraged to help or even to dry the baby herself, provided she is prepared in advance to do this and does it quickly. Both mother and baby should be wrapped in blankets to avoid heat loss. They should be allowed to stay together undisturbed for the first hour or two after delivery. Any examinations of the newborn that are essential should take place with the mother and baby together. Non-essential examinations should be delayed for an hour or two so that the mother and baby can be as undisturbed as possible during the early postpartum period. After some time, and when the baby shows signs of readiness such as salivating, rooting for the breast and even crawling into a position which facilitates feeding, the baby will take its first breastfeed. Any medications given to the mother may interfere with this spontaneous newborn response and the mother and baby may then require encouragement and assistance with this feed. The spontaneous interest of the baby in breastfeeding usually occurs within the first hour to hour and a half after delivery.

The baby should stay with his/her mother as long as desired (night and day) without any schedule for feeding, and the mother should be able to participate actively in the care of the infant (rooming-in). Sadly, separation is the routine in many hospitals and much effort should be made to promote a different plan of nursery organization to facilitate early breastfeeding and mother–infant bonding.

In some instances, either the mother (who might have to recover from an operative delivery or suffer from complications) or the baby (who might be in need of special care) may not be available for early contact. In these cases the separation between mother and infant should be restricted to as brief a period as possible. As soon as the mother is feeling better or the child is recovering, frequent visits to the neonatal unit should be permitted in order to enable the mother to take care of her child as soon as possible. Some units encourage rooming-in of mothers with their newborn babies even in special care nurseries. This approach is to be encouraged whenever possible.

When transporting the baby from the delivery room to the nursery, always bear in mind the need to prevent hypothermia. The baby should therefore be wrapped in a soft blanket either with his/her mother or in the arms of another person (father, nurse, relative) if the mother is not ready
for transport. A heated cradle or incubator can also be used for transporting the baby. The principles of the “warm chain” (see below) should be always kept in mind.

**Preventing heat loss at birth: drying, wrapping, weighing, breastfeeding**

The **warm chain** is a concept introduced to describe a set of interlinked procedures which will minimize the likelihood of hypothermia and assure the wellbeing of the baby. Failure to implement any one of them will break the chain and increase the possibility of undesirable cooling of the infant. The links in the warm chain include:

- training all persons involved in the birth and subsequent care of the baby; preparation of the place of delivery by ensuring a clean, warm, draught-free room;
- provision of a clean and warm surface, drying and wrapping warm materials;
- immediate drying of the newborn baby;
- giving the baby to the mother quickly after birth and providing warm wrappings for them both;
- allowing spontaneous breastfeeding to occur when the baby shows signs of readiness for a feed, while maintaining warmth;
- putting a warm cap on the baby’s head;
- ensuring warm, safe transport, if necessary.

If this cannot be done, a satisfactory arrangement is to dry the baby and keep him/her as close as possible to the mother, ideally through skin-to-skin contact and warm wrappings for them both. Ensure that the room is warm. It is difficult to warm infants who become hypothermic – wrapping a baby who is already cold may simply keep him/her cold. It is much easier to keep the infant warm in the first place.

**Cleaning the airways**

Aggressive prolonged suction can delay the onset of spontaneous breathing in the healthy newborn and cause prolonged spasm, and is not indicated unless the amniotic fluid is severely stained with thick meconium or blood.

If suction is required, a 10 FG (or if the baby is preterm an 8 FG) soft suction catheter should be connected to a suction source not exceeding 100 mmHg. This should not continue for longer than five seconds in the absence of meconium. The catheter should normally not be inserted further than 3 cm from the baby’s lips at term.

The conditions mentioned above (healthy infant, asphyctic and low-birth-weight infant or an infant with a birth defect or trauma) can be variably associated and therefore need integrated procedures for care. This section deals with the healthy infant.

**Care of the cord**

There is no need to rush to clamp and divide the cord except in an emergency situation. The baby could be dried and given to the mother first, and the cord cut when the pulsing stops. The cutting of the cord and handling the placenta may be bound by tradition in different cultures. It is important that health personnel are aware of these traditions and of the mother’s own requests, and that they try to fulfil these as far as possible if they are safe for the mother and baby.

**When to clamp the cord**

In vaginal delivery the expulsion of the placenta results in an increase in pressure that could cause a passage of blood from the placenta to the baby.

Early clamping of the cord (i.e. immediately after birth) results in low haemoglobin values and may result in anaemia after 1–2 months. On the other hand, clamping the cord too late results in
hypervolaemia and possibly hyperviscosity of the blood (packed red cell volume >70% in central venous blood), which may lead to respiratory difficulties and volume overload of the heart.

If the newborn baby is placed on the mother’s breast, the cord could be left unclamped until the pulsations have stopped, without an increase of the haemoglobin value of the infant. Thus, clamping the cord at approximately one minute after birth seems to be most advantageous.

**How to clamp and cut the cord**

Inelastic tying material such as strings or bands are commonly used. However, this old, widely used procedure results in a very temporary closing of the vessels. As early as half to one hour after birth the shrinkage of the cord loosens the band and reopens the vessels, increasing the risk of both bleeding and infection.

The most efficient and cheap method of clamping the cord is to use a rubber band. After clamping the cord with forceps and cutting it, the rubber band is applied around the cord with the help of the forceps. In many developed countries a plastic cord clamp is used. This is expensive, not reusable, and thus inappropriate for use in countries with limited resources.

**How to clean the cord**

The cord stump remains the major means of entry for infections after birth. The principles of clean cord stump care (keep it dry, clean and do not apply anything) apply at home as well as in the health facility. The stump will dry and mummify if exposed to the air without any dressing, binding or bandages. It will remain clean if it is protected with clean clothes and is kept from urine and soiling. No antiseptics are needed for cleaning. If soiled, the cord can be washed with clean water and dried with clean cotton or gauze.

Local practices of putting various substances on the cord stump – whether in health facilities or at home – should be carefully examined, discouraged if found harmful and substituted with acceptable ones if necessary.

If the umbilical stump is draining pus, the skin around it is becoming red and it has a foul smell, these may be signs of umbilical infection that requires treatment with antibiotics.

**The first feed**

Within the first hour or two after delivery the healthy baby instinctively searches for food. In the first couple of hours of life the baby is alert, active and ready to feed. If the mother has been given certain drugs during labour the baby may not be so alert.

Placed on the stomach of the mother, a healthy, term baby is able to crawl towards the breast. If it has not been disturbed or sedated, the baby can find the breast without any help, usually within the first hour. The birth of the placenta is facilitated by increased maternal oxytocin production, stimulated by the baby’s contact with the nipple.

Some babies need a couple of hours or more, and some may not be ready to feed until they wake up after their first sleep although early and frequent feeding is to be encouraged. The process of childbirth is not finished until the baby has safely transferred from placental to mammary nutrition.

**What the health professional can do**

- Support the woman during labour and delivery in a way that minimizes the need for interventions.
- Encourage the woman to try pain relief measures which will not interfere with breastfeeding. If possible, avoid medications which may eventually have a sedative effect when passed on to the baby transplacentally.

- Allow the baby to remain with the mother, skin-to-skin, from immediately after birth until the baby has finished the first feed.

- Let mother and baby interact at their own pace. Only help them when you believe it to be absolutely necessary or when the mother asks for assistance.

- Postpone any routine procedures following birth that can safely wait until the mother and baby are ready, i.e., for at least one to two hours, for example measuring and dressing the baby.

- Separate the mother and baby only if absolutely necessary. The preliminary observation of the baby can usually be done while it stays close to its mother. Even a brief separation before the first feed can disturb the process.

- If the mother is sedated or feels too tired, help the searching baby to have the first feed, at the breast, without any effort from the mother.

- Encourage and help the mother to have skin-to-skin contact with her baby as much as possible during the first days after delivery. If their interaction in the first hours was disturbed for some reason, it can be “re-enacted” at any time during the first days, and even weeks, after the birth.

- Discourage the use of pacifiers and bottles during the establishment of lactation when the baby is learning to breastfeed. When some babies are fed with an artificial teat they develop a preference for it and this can reduce their enthusiasm for the breast.

Let the baby start to feed when it shows that it is ready.

**Prophylactic procedures**

**Vitamin K**
A neonatal deficiency of vitamin K exists in at least 0.5% of all newborn babies. The risk of gastrointestinal or other types of neonatal bleeding is especially high in preterm babies, and low for gestational age babies. To prevent early bleeding and later haemorrhagic disease of the newborn, vitamin K prophylaxis is suggested.

The oral administration of two doses of 2 mg, one on the first day and one on the seventh day of life has been shown to be almost as effective as one single dose of 1 mg intramuscular injection. Although the oral administration is easier and cheaper, it presents the disadvantage of a more complicated schedule of administration.

**Ocular prophylaxis**
In regions with a high frequency of gonorrhoea, prophylactic treatments with either 1% silver nitrate, 1% tetracycline or 0.5% erythromycin ointment have a similar efficacy. We recommend the use of 1% tetracycline ointment which is harmless, affordable and effective. Both tetracycline and erythromycin are also effective in preventing chlamydia. The main disadvantage of silver nitrate is that it frequently causes chemical conjunctivitis.

**BCG vaccination**
Since the only contraindication for BCG vaccination is the symptomatic HIV infection – a situation which never occurs in the neonatal period – BCG vaccination should be given intra-
dermally to all babies before discharge from the hospital in every country where there is a significant risk of tuberculosis and national policy for immunization includes BCG.

**Bathing the infant**

It is best to postpone bathing the infant or cleaning the vernix with oil. If cultural practices in some areas demand bathing, or if the baby is particularly soiled with blood or meconium, washing 2–6 hours after birth is permissible as long as the baby’s temperature is normal. When the bath is given the midwife or nurse should:

- warm a small area or corner of the room;
- use warm water tested with the elbow, sit close to the heat source and undress the infant on her lap;
- bathe the infant quickly and gently;
- immediately wrap the infant in a warm, dry towel and dry him/her thoroughly from head to toe;
- quickly dress and wrap the infant, remembering to place a cap on the baby’s head;
- place the infant close to the mother and allow breastfeeding.

When nursing care is given, such as changing the nappy (diaper), care should be taken not to unduly expose infants to a cold environment but to do all the procedures quickly and keep the baby covered as much as possible.

**Swaddling**

Sometimes after bathing, babies are tightly swaddled. It used to be thought that swaddled babies were protected from external infections. There is no scientific evidence that this is the case. It is preferable to wrap the baby loosely in a cotton cloth or a warm shawl or, as a compromise, to swaddle only the lower part of the body, leaving the arms and head free to move.

The mother should not hesitate to keep the baby with her in bed, if she thinks this is more comfortable. There is no risk of smothering or infecting the baby.

Tight swaddling should be discouraged for several reasons:

- blocking the movement of the diaphragm reduces ventilation of the lungs;
- blood circulation is decreased in different parts of the body;
- lack of air space between body and swaddling sheets prevents the baby keeping warm;
- restricting the free movement of the limbs prevents the development of neuromuscular coordination;
- tight swaddling with head swaddling can discourage breastfeeding as the baby cannot move its head and open its mouth properly for correct attachment to the breast;
- a swaddled baby is more sleepy and less responsive to frequent breastfeeding, which interferes in the stage of breastfeeding and lactation establishment.

**Detailed examination of the newborn**

Unless there are severe problems with the baby or the mother, the baby should be delivered onto the mother’s abdomen and not removed for about an hour or more and until the first breastfeed
has occurred. All routine examinations of the baby, which are not essential, should be either delayed or conducted with the baby on the mother’s abdomen or adjacent to the mother on her bed. Babies should not be separated from their mothers unless absolutely necessary. Almost every baby can be cared for in this way.

Later, and probably within a few hours of delivery, the normal newborn baby should be examined as described below.

**General appearance**

- The normal full-term baby weighs approximately 3.5 kg, measures 50 cm in length when extended and the head circumference is 34–35 cm.
- He/she lies in an attitude of flexion.
- He/she has a lusty cry.
- The skin is covered in vernix caseosa, a white sticky substance.
- Lanugo (fine hairs) cover the skin.
- The baby should be pink all over.
- The baby should move his/her limbs equally on both sides.

**Method of examination**

The baby should be examined from the head downwards.

- **Head** – shape:
  - some babies are born with a cephalhaematoma (swelling on the head caused by the trauma of the birth), which will disappear within 24 hours of birth and cause no ill effects; the baby should be treated as normal and the mother reassured;
  - most babies are born with a degree of moulding caused by the skull bones overlapping during the process of birth; again the shape of the baby’s head will have returned to normal within 24 hours.
- **Face** – a general impression of the face is made by looking at the position of the eyes, nose and mouth to ensure that they are in the correct position. The baby may open its eyes spontaneously when sucking or held upright. The mouth may be opened by pressing on the jaw; this allows the mouth and tongue to be inspected. The palate can be inspected for cleft palate by visualization.
- **Chest and abdomen** – the chest should move rhythmically with breathing, the nipples and breast tissue should be noted. The abdomen should be rounded, and there should be no swellings at the base of the umbilical cord. The umbilical cord should contain three vessels.
- **Genitalia and anus** – the sex of the baby should be checked. The anus should be examined for patency. This is usually done by taking the baby’s rectal temperature.
- **Limbs** – in addition to noting the length and movement of the limbs, the fingers and toes must be counted and examined to see if they are separated. The hips should be tested to see that they are not dislocated.
- **Spine** – the baby’s spine should be examined while he/she is lying prone as any swelling or dimples or hairy patches may signify a spinal defect.
The baby must be weighed and measured and its identification label checked with the mother and put on while the baby is with the mother.

Observations and details of the examination must be recorded in the records of the baby.

**Prevention of infection**

The newborn is at risk of developing infections if strict attention is not paid to maintaining hygiene. **Remember** that great care must be taken to prevent infection: hands must be washed thoroughly before and after handling the newborn. Plastic or rubber gloves **must** be worn if available, and an aseptic technique used throughout the second and third stages of labour.

It should also be noted that health care providers are a potential source of infection as they move from mother to mother or from baby to baby. The mother herself is the least likely person to spread infection to her newborn, and if she is breastfeeding she will probably pass antibodies to any infection that she has to the baby in her milk. Mothers should, therefore, be encouraged to do as much for their babies as possible in order to minimize the potential spread of infection to them from numerous different care givers.

**Strategies for the control of birth asphyxia**

Certain conditions during pregnancy are associated with an increased risk of birth asphyxia (e.g. preterm labour, pre-eclampsia) and early signs of asphyxia may occur during labour (intrapartum asphyxia). Four strategies for controlling birth asphyxia can be identified:

1. referral of high risk pregnant women to a tertiary care level;
2. early recognition of prenatal signs of possible asphyxia (meconium-stained amniotic fluid, abnormal fetal heart beat pattern);
3. management of the newborn with asphyxia, in terms of both urgent and skilled resuscitation;
4. management of post-asphyctic conditions.

The first two points are the responsibility of the obstetricians and midwives. Health professionals involved in neonatal care should make sure that these interventions are made by promoting interprofessional communication and collaboration. The following section will deal with points three and four. While they are normally the province of the neonatal specialist, it is important that midwives and obstetricians are also familiar with the essential elements of care.

**Clinical signs and classification of asphyxia in the newborn baby**

A quick and easy system can be used to identify newborn babies who need immediate resuscitation by looking only for the two most important parameters: **breathing** and **heart rate**.

Assessment of the newborn by these two parameters allows babies with mild or severe neonatal asphyxia to be rapidly identified and resuscitated according to response to treatment (see Figure 18.2).
A more complex system, the Apgar score (which was originally aimed at classifying the condition of infants exposed to obstetric analgesia and anaesthesia, see Table 18.1) has been used to systemize observations on the vitality of the newborn infant for both therapeutic and prognostic purposes. There are problems with the use of this method, however:

- too often it is not correctly evaluated; if it is correctly performed, the evaluation of the Apgar score takes some time and so precious time may be wasted when rapid evaluation and resuscitation are needed;
- it is not predictive of outcome (only very low Apgar scores at 10 and 20 minutes after birth are predictive of neurological damage).

Table 18.1 Evaluation of the newborn infant: Apgar score

<table>
<thead>
<tr>
<th>Sign</th>
<th>Score 0</th>
<th>Score 1</th>
<th>Score 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>Absent</td>
<td>Below 100/min</td>
<td>Above 100/min</td>
</tr>
<tr>
<td>Respiratory effort</td>
<td>Absent</td>
<td>Slow, irregular</td>
<td>Good cry</td>
</tr>
<tr>
<td>Muscle tone</td>
<td>Limp</td>
<td>Some flexion of extremities</td>
<td>Active</td>
</tr>
<tr>
<td>Response to catheter in nostril</td>
<td>No response</td>
<td>Grimace</td>
<td>Cough</td>
</tr>
<tr>
<td>Colour</td>
<td>Blue</td>
<td>Body pale pink, extremities blue</td>
<td>Pink</td>
</tr>
</tbody>
</table>

Management of the asphyctic newborn

If the newborn has irregular/absent breathing and/or a heart rate <100/min within 30 minutes of delivery, assisted ventilation should be initiated and the child should be reassessed after a few minutes. Time should not be wasted trying cutaneous stimulation or airway cleaning.

The cord of every child that requires immediate resuscitation is clamped and cut immediately and the baby is moved to a resuscitation table.
A more detailed management of the asphyctic baby (with mild or severe neonatal asphyxia) is described below.

In **mild neonatal asphyxia** the infant’s breathing is slow, irregular or even absent. The heart rate is $>100$ beats per minute, the muscular tone is relatively good and there is cyanosis. The baby should be ventilated with a bag and mask for 1–2 minutes and then reassessed. If the baby is breathing regularly and the heart rate is consistently $>120$ beats per minute, he/she can be given to the mother. If the baby is still breathing irregularly and the heart beat reaches $<100$ beats per minute, endotracheal intubation and external cardiac massage should be performed. In intermediate situations, with breathing still irregular and heart rate above 100 beats per minute but below 120 beats per minute, the baby should receive ventilation for a few more minutes and then be reassessed.

**Procedure and equipment**
The most commonly used artificial ventilation aid is the bag and mask. Provided that adequate techniques and appropriate equipment are used, 85% of infants with even severe asphyxia can be effectively ventilated using this method. No other procedure or equipment is necessary in such cases.

The bag must be:
- self-expanding with a volume of approximately 300–500 ml
- easy to take apart for cleaning and sterilization in boiling water
- easy to put together without risk of malfunctioning.

Many bags have pressure-limiting valves. With mask ventilation there is no significant risk of the pressure being too high (due to leakage into the oesophagus) and valves are not therefore needed. The mask should be flexible in order to fit tightly on to the face. Soft and circular masks are more effective than triangular ones.

**Correct positioning and use of the bag and mask**
The infant should be put in the supine position with the head lowered and tilted slightly backwards (Figure 18.3). The first breaths require high insufflation pressures (50–70 cm $H_2O$); the first insufflation should be prolonged for at least five seconds. When the lungs are filled, ventilation is easier and only 30–40 cm $H_2O$ is needed to continue with a frequency rate of 60 cycles per minute. Ineffective insufflation is caused either by inadequate technique or obstructed airways. It is always important to measure heart rate to assess the effect of assisted ventilation and to check the expansion of the thorax at every cycle.
The severely asphyxiated baby will make no respiratory efforts during the first 30 seconds of life, the heart rate will be low (<100/min), the muscular tone low and the skin will be grey/pale.

The baby should be treated with bag and mask ventilation for 1–2 minutes and then reassessed. If breathing is still irregular or absent but the heart rate is >100 per minute, continue bag and mask ventilation for another 3–4 minutes and then reassess the baby. If the breathing and heart rate become steadily regular you can give the baby to the mother. If the baby is not breathing at all and the heart rate is <100/min after 1–2 minutes of bag and mask, endotracheal intubation and external cardiac massage are required. If, during endotracheal intubation and external cardiac massage, the heart does not improve or progressively worsens, use vasoactive drugs.

**Endotracheal intubation** is rarely the first intervention required. It can be appropriate as the first intervention only for:
- very low-birth-weight infants with severe asphyxia
- infants with absent breathing and very slow heart rate.

**Supplementary oxygen**
This is generally recommended for resuscitation, although oxygen-enriched air (50–60% O₂) should be used. Theoretically, the use of oxygen-enriched air is of uncertain value. The use of 100% oxygen may result in atelectasis of the lungs and might well be toxic, but in most hospitals, pure oxygen is the only gas available. When only pure oxygen is available, use it only until cyanosis disappears. There are good reasons for assuming that air is as effective as oxygen-enriched air in resuscitating babies at birth and there is certainly no reason to refrain from assisted ventilation due to lack of oxygen.

**Drugs**
If during endotracheal intubation and external cardiac massage the heart rate does not improve or progressively worsens, significant metabolic acidosis can be presumed. There may well be a need for myocardial stimulation by epinephrine in a dose of 0.1 ml/kg of 1:10 000 solution, administered via an umbilical catheter or endotracheal tube.
Administration of sodium bicarbonate (2 mEq/kg as a 0.5 mEq/ml) may partially correct metabolic acidosis and improve the effectiveness of the epinephrine dose, which can be repeated. Avoid the use of such drugs in infants weighing less than 1500 g.

**Indications for discontinuing resuscitation**

Resuscitative efforts should be discontinued if an adequate circulation has not been achieved within 15 minutes. If the baby has an adequate circulation but is failing to make any respiratory effort by 30 minutes, he/she should be transferred to a neonatal unit for further respiratory support and reassessment.

**Treatment of post-asphyctic infants**

Post-asphyctic infants are at high risk of metabolic disorders such as hypoglycaemia (and hypocalcemia) and hypothermia. Infants who are severely asphyxiated may begin to manifest transient failure of various organs. Some show evidence of renal injury, even after moderate asphyxia; myocardial failure and hypoxic-ischaemic encephalopathy is usually only seen after more severe asphyxia. Care of such babies includes to:

- provide a warm environment;
- promote early and frequent breastfeeding (gavage feeding with mother’s milk if unable to suck);
- promote early and frequent mother-to-infant skin-to-skin contact;
- monitor heart rate, respiratory rate and, if possible, renal function, blood glucose and calcium;
- plan close follow-up visits for better evaluation of growth and development of these infants.
Module 18. Reading

Birth asphyxia

Most babies are born in a good general condition; 85% will require no resuscitation. However, 10% will require minor attention and some resuscitation and 5% may need to be resuscitated with artificial respiration.

Some 30–40% of this third group (the 5%) will be entirely unexpected, not having shown any sign of fetal distress during labour.

The initiation of respiration is dependent on many interrelated factors:

- the maturity of the fetus;
  - developed lungs
  - developed respiratory centre in the brain
  - the presence of surfactant in the lung tissue.
- the respiratory centre;
  - active and mature
  - responsive to carbon dioxide levels
  - unaffected by drugs.
- the “squeeze” effect of the birth canal;
- pressure on the thorax expelling lung and amniotic fluid from the lungs at vaginal delivery;
- recoil of the compressed ribs and intercostal muscles, drawing air into the lungs at vaginal delivery;
- response to stimuli: once delivered, the baby is subjected to light, noise, gravity, a drop in temperature and being touched and handled.

Most babies are born in a good general condition and require no resuscitation. However, trained skilled personnel should be present if it is anticipated that the fetus may need help in establishing respiration. **As it is impossible to predict which babies might require resuscitation, every attendant at births should be trained in neonatal resuscitation.**

Skills in a disciplined approach to action are very important:

- speed/timeliness
- skills needed
- priorities.

Some conditions may be regarded as routinely requiring the presence at delivery of personnel trained in resuscitation:

- breech delivery
- instrumental delivery
- prolonged labour
- fetal distress
maternal conditions, e.g. diabetes, hypertension.

Midwives must check and prepare equipment in case of an emergency:

- ensure oxygen is available (mask and bag)
- keep the delivery room warm (23°C) and free from draughts
- have warm clothing and towels for the baby ready
- switch on the incubator.

These preparations are scrupulous about thermal control of the infant. Even healthy infants have difficulty in maintaining a normal body temperature soon after delivery. Small, sick or sedated infants are more likely to become chilled and their condition will worsen if they are stressed by cold. The effect on the infant is to increase oxygen consumption and this may impair the ability to survive.

Heat is lost through evaporation, conduction, convection and radiation. Warm clothing, bonnets, blankets or specially designed thermal swaddlers (“silver swaddlers”) help to reduce the escape of heat. However, it should be remembered that the best way to warm the baby is skin-to-skin contact with the mother.

**Assessment of clinical status**

It is standard practice to record the Apgar score for all babies at one minute after birth. It may also be recorded at five, ten and fifteen minutes, etc. after birth as long as the infant requires resuscitation.

The status of newborn infants at birth falls into one of three groups:

- **Normal**
  - Apgar score 8–10
  - the infant is pink and is breathing or crying; the heart rate is strong; tone is good and there is an active response to stimuli.

- **Mild/moderate asphyxia (blue)**
  - Apgar score 4–7
  - the infant is usually blue and apnoeic with a strong heart rate at 90–160/minute; muscle tone is present but diminished as is the response to stimuli.

- **Severe asphyxia (white)**
  - Apgar score 0–3
  - the infant is usually pale (or cyanosed) due to peripheral vasoconstriction; the heart rate is slow and weak or even absent; tone is flaccid; there is no response to stimuli; the infant is apnoeic.

**Management of asphyxia**

The management principles are:

1. Clamp and cut the cord.
2. Keep the baby warm, wrap it and dry it with a towel.
3. Remove the baby to the resuscitation table/trolley (keeping it warm).
4. Position the baby carefully (support shoulders and neck), with neck neither extended nor flexed.
5. Reassess the baby’s status using the Apgar score; if the score is between four and seven, stimulate by gently clearing the nose by catheter and dry with a warm towel.

6. Only use opiate antagonist if the mother has received pethidine, morphine, heroin or another opiate within the previous eight hours.

**Bag and mask**
This is simple, effective and non-invasive.

**Intermittent positive pressure ventilation (IPPV)**
Thirty puffs per minute of air/oxygen using a bag and mask (Ambu or Laerdal) at 30–35 cm/H2O.

**Endotracheal intubation**
Endotracheal intubation (ETT) is used if the infant does not respond to the bag and mask method. Give 2–3 litres/min of oxygen using ETT. Keep the baby warm at all times. Observe air entry/colour. Check heart rate and aim to keep it above 100 beats per minute.

**Cardiac massage**
This is used if the heart rate is absent or below 50–60 per minute despite IPPV. Apply 100 times per minute.

**Drugs in current use**
- IV calcium gluconate 10% 1 ml/kg
- IV adrenaline 0.1 ml/kg
- IV sodium bicarbonate 1–2 ml/kg of 8.4% given slowly into a peripheral vein 2–3 ml/minute.

**Summary and conclusion**
Remember to have an experienced, skilled professional trained in resuscitation at delivery if you anticipate a problem. Alternatively, transfer your patient to a major unit early enough to ensure a safe delivery and skilled help for the infant.

**Learning points:**
- Keep the airway clear
- Keep the infant warm
- Use the bag and mask to oxygenate
- Check the heart rate
- Use cardiac massage if the heart rate is less than 50/minute.
At the end of this module participants should be able to:

- care for mothers and babies during the postpartum hospital stay
- prevent infection during this time
- educate mothers about the prevention of SIDS
- encourage mothers to perform appropriate postpartum exercises
- facilitate the development of postpartum psychological adjustment within the new family
- care for a woman and her family who experience pregnancy loss.

Readings:

Puerperal sepsis
Postpartum depression and companionship in the clinical birth environment

The puerperium is the period after the birth of the baby when the organs of the body return to the pre-pregnant state and lactation becomes established. It is a very important time for the mother, baby and family unit. These changes usually take up to 6–8 weeks, although some organs can take much longer to recover from the effects of pregnancy. Changes will be most marked in the first week to ten days following the birth. It is during these first few weeks that the foundations for good recovery, health and adaptation of both mother and baby to their new status are established. The physiological adjustment to motherhood is varied. Some women experience a number of conflicting reactions and feelings.

Unfortunately, care during this vital postpartum time is often not seen as being as important as antenatal and intranatal care. Care during the puerperium is often described as the “Cinderella” of maternity care.

The quality and effectiveness of postpartum care has not yet been fully evaluated. It is important, therefore, that questions are asked to see if the care given meets the needs of the individual and that the outcome of the care is a healthy mother and baby.

It is clear that the puerperium is an integral part of the childbearing process.

The care of mothers and babies during the puerperium should be based on four basic principles:

- promoting the physical and emotional wellbeing of the mother and baby
- establishing a healthy method of infant feeding
- promoting confidence in the mother caring for her newborn baby
- promoting a method of family planning to meet individual needs.

Management of the puerperium

Mothers may spend anything from a few hours to ten days in hospital after delivery. Whether in hospital or at home, the midwife has an important role to play in the care of the mother and baby.
during the puerperium. She is responsible for the general care of both mother and baby and should make regular and frequent (possibly daily) observations of their progress. Detailed records must be kept at all times, and recordings must be made as near to the event as possible. Care should be individualized.

The *Mother-baby package* (WHO 1994), recognizing the different levels of resources in different countries, states that “all women should receive at least one postpartum visit within the first week of delivery in order to ensure early detection and management of hypertension, haemorrhage and sepsis”. The postpartum period should also be used to provide support for breastfeeding and is an opportunity to provide family planning information and services. For mothers who are unable to leave their homes for cultural or economic reasons, an outreach or community midwifery practitioner should be available.

The understanding and support given at this time is essential. It is important that the midwife helps to build the mother’s confidence in the care of her newborn baby. This is achieved by continuing to educate the mother, and in many instances the father and the other members of the family. It is vital to stress the need to teach the mother to care for herself as well as her baby. Unfortunately, in many countries the emphasis of all concerned (and especially of the mother) is exclusively on the baby, to the detriment of the health of the mother herself.

When the mother arrives on the postnatal ward her general condition is observed. This includes observing temperature and blood pressure and palpating her uterus to make sure it is contracted and the lochia not excessive.

The mother must be encouraged to pass urine within eight hours of delivery. If the bladder is excessively full the uterus may relax, causing bleeding from the uterus. Some mothers have difficulty passing urine after delivery either because of a loss of the sensation of fullness or because they are frightened that passing urine will be painful. Catheterization may be necessary, but this should be avoided if possible because of the risk of infection.

Mothers should be encouraged to walk about within a few hours of delivery. However, the mother should be assisted the first time she gets out of bed to go to the bath or shower as she may feel weak and faint. Early mobility ensures that the mother is caring for and getting to know her baby and the baby is getting to know her.

The mother should be encouraged to rest during these early days as much as possible. Inability to sleep must be regarded with concern. Rest during the day is important, since the mother will need to feed her baby throughout the day and night and can no longer rely on a good night’s sleep to recover from the stresses of the day.

**Prevention of infection**

Good hygiene must be promoted if infection is to be minimized. Regular washing of the hands is important, particularly before caring for the baby. The mother must be encouraged to keep her perineal area clean, particularly after passing urine or faeces. Bathing once or twice per day, washing the perineum once or twice per day, by using a bidet or simply sitting over a bowl, will keep the perineum clean. The perineum must always be dried after bathing, and talcum powder or deodorant must not be applied. Sanitary pads must also be changed frequently to prevent infection.
The mother must be watched for signs of infection arising after delivery. The handout on puerperal sepsis gives details of the care of the mother with perinatal infection. Infection of the breasts can also be guarded against by keeping the nipples clean and dry and fixing the baby correctly onto the breast in order to avoid damaged and cracked nipples. There is no need to put any creams or ointments or lotions on the breasts or nipples. None of these have been shown to be effective in reducing sore or cracked nipples. It is beneficial to spread a few drops of colostrum or breast-milk over the nipple or areola following a feed.

Simple but effective measures for preventing infection in the baby are: scrupulous washing of hands before and after handling the baby, and ensuring that all equipment used for a baby is used exclusively for that baby alone.

The umbilical cord should be kept clean. Throughout the world there are numerous methods of caring for the cord, but the most effective is to use no applications to the cord but to keep it clean and allow it to dry over the first few days. Applications (dyes, medications) to the cord often prevent it from drying out. (It is true to say that most of the cord medications used in hospitals do not cause harm, even if they do prolong the drying process.)

It is essential to wash hands before touching the cord in order to minimize the transmission of infection.

GROUP WORK
Discuss current local practice in caring for the cord and develop a future strategy based on this discussion.

Common problems in the postpartum period

After-pains
After-pains are a minor disorder that occurs in the puerperium, but they can be both uncomfortable and distressing for the mother. After-pains are cramp-like pains in the lower abdomen caused by uterine contraction. These pains may be more severe if a blood clot or placental fragment has been retained in the uterus. They may be particularly noticeable when a mother breastfeeds. This is because the uterus contracts as a result of the maternal oxytocin release induced by lactation. A mild analgesic is often all that is required to reduce the pain.

“Third day blues”
Some mothers go through a period of feeling depressed and unable to cope, usually within two or three days of delivery. This is quite normal and is thought to be due to a combination of maternal hormonal changes, together with emotional changes such as the release of the tension of awaiting labour, experience in the maternity unit after the delivery, the reactions of family and friends, and a growing realization of the demands on the mother following the arrival of a new baby. Weepiness and distress around the third day after delivery occurs in about 80% of all new mothers and is best cared for with tender loving care.

A few mothers (under 1%) develop a very serious condition called puerperal psychosis. Mothers may lose touch with reality and may have delusions and excessive concerns or fears about themselves or their babies. They may be capable of harming their babies and should be observed carefully during this time. They should be referred to specialist psychiatric help.
Postpartum depression, a condition that affects about 14–20% of women worldwide, is a more severe form of emotional disturbance than “third-day blues”. It arises in women within the first few months after delivery and may last for a considerable time. Most mothers who experience some months of depression in the first year after their baby’s birth will recover fully and may not develop the same symptoms with a later baby, but some will experience similar problems after each delivery. It is thought that a major contributing factor to postpartum depression is the quality of support available to the mother during her first few months of parenthood, coupled with a previous disposition to depression and the experience of the birth itself.

Ideally the midwife who provides postnatal care will have been caring for the mother throughout her pregnancy and labour and will already be familiar with the mother and her obstetric and family history. However, when that is not the case (as it most frequently is not), it is important that the mother receives consistent advice from all the staff involved in her care. Conflicting advice and fragmented care can render effective support of the mother in the puerperium almost impossible. In order to meet the mother’s individual needs, ideal models of care involve assessment of those needs, and the planning, implementation and finally evaluation of her care.

**Care of the baby**

In many countries it is the mother who is expected to do most of the caring for her baby, thereby getting to know her baby. However, in many countries fathers are increasingly expected to participate in the care of their babies and children.

**Rooming-in**

It is now considered normal for a baby to be kept at its mother’s bedside. Evidence shows that the baby should **not** be separated from the mother unless the mother is too ill to care for the baby or – for short periods – if the mother specifically requests it. This helps to support breastfeeding and assists mothers to develop confidence in caring for and handling their babies. In hospital this process of keeping the mother and baby together is called “rooming-in”.

Although mothers are expected to do most of the caring for their babies, the midwife still has a vital role to play. She is not directly responsible for caring for the baby but is responsible for ensuring that the mother herself is capable of caring for her baby. Rather than being the provider of the care, the midwife should be more of a supporter and educator. Mothers (particularly first-time mothers) will need a great deal of encouragement and support when feeding, handling, dressing and bathing their babies.

Mothers should be taught that when placing the baby in the cot it is best that it should not be wrapped too tightly (swaddled); the baby should be allowed to move freely in the cot, but at the same time it must be kept warm. In some countries this advice may run against the more traditional practices and must be introduced with sensitivity, respect and caution.

The mother should be taught about the risks of cot death. Years of research have led to the following guidelines for mothers (Sands 1991):

- put the baby to sleep on its back
- no one should smoke in the same room as the baby
- prevent the baby from getting overheated
contact the doctor or other appropriate health care worker if the baby is unwell in any way.

While no one can absolutely guarantee that cot death can be prevented, medical research has shown that the risks can be reduced if parents follow the steps given above.

**Postnatal exercises**

Postnatal exercises are essential for a variety of reasons. For instance, they will prevent circulatory problems, help to avoid perineal discomfort and oedema and strengthen abdominal and perineal muscles, and can help to prevent problems in future pregnancies and labour. The exercises should be started the day after the baby is born and continued until the baby is at least three months old (Figure 19.1).

To improve circulation the feet should be bent up and down firmly; a circling movement at the ankle helps to reduce any swelling.
The pelvic floor muscles have been very stretched during pregnancy and delivery. If they do not regain their tone the mother may suffer from stress incontinence, vaginal laxity or a prolapse. These simple exercises can be done unnoticed at any time. They involve contracting the vaginal and perianal areas and “drawing up” the tissues into the abdomen, maintaining the contraction for a count of four, and then relaxing slowly.

Abdominal exercises can be started a few days after delivery. They should be practised twice a day for approximately five minutes. The mother should: lie supine with knees slightly bent; contract and tighten anterior abdominal wall muscles; rotate pelvis by lowering knees slowly to the left and then to the right; then in the same position, contract and tighten anterior abdominal wall muscles, lift head and put chin on chest, extending arm and sliding hand towards the knee.

### EXERCISE
a) Practise some of the exercises described above.
b) What provision is made within your unit for the teaching of postnatal exercises? How can this be improved?

---

**Postpartum adjustment and the beginnings of new family relationships**

The postpartum period provides an opportunity for the mother and baby, together with the partner or other family members, to begin to find new ways of relating to each other while incorporating the new baby into their midst. It is most important that the partners be encouraged to share this experience as much as possible and spend as much time together as they can. Husbands/partners should be encouraged to visit and should be helped with their concerns about their new family situation. Some maternity hospitals have made it possible for the partner to stay with the mother in the postpartum period even if they are required to go to work during the day. This might appropriately be described as “family-centred care”. Other maternity systems encourage early discharge from the hospital so that the mother and baby are cared for in their own home as soon as possible after delivery. What the mother chooses for herself – rather than what any one hospital system prescribes as the rule for all mothers – is frequently the best arrangement.

Whichever system of care is provided, it is important to support the new family to grow and develop together in their shared caring for their new baby.

**Care of the woman/family who experience a pregnancy loss or the birth of a baby with an abnormality**

In these situations it is almost always better for the mother to have contact with her newborn (dead or alive) as soon as possible after birth. Ideally her partner or chosen companion should be with her at this time, as should the attending doctor and midwife. She should be encouraged to express her grief, to greet her baby even if she must also say goodbye, and to ask and receive information about any concerns she may have. The attending care giver may have to repeat this information many times and must also be ready to accept expressions of anger and distress from the couple/family. This is a normal reaction to such immense loss and grief and cannot be criticized or condemned. Parents need immense support to cope with such extreme sadness and disappointment as well as the guilt and self-blame which are common reactions. The couple should be helped to spend time together, to seek and receive information and to be supported.
They should be provided with whatever mementos of their baby are possible. Many hospitals now take a photograph of the baby shortly after birth, dressed in attractive baby clothes or wrappings. This photograph is offered to the parents as a memory of their baby or, if refused, is saved for them in case they change their minds later and want the photograph (as often happens as their memories of the baby fade and the pain is replaced with acceptance and sadness). Other remembrances of their baby may be kept for them, if appropriate, such as a lock of hair, or the baby-identifying label.

Consideration should be given to where such mothers are cared for in the hospital. It is rarely appropriate for them to be close to mothers with normal and healthy babies, but total isolation may also be emotionally unhelpful. If possible, the woman should be given the choice as to where she would like to be cared for providing there are no medical contraindications which would restrict her choice. Whether she is cared for in a single room away from other mothers (if one is available), or with other mothers, or at home, the mother should not be made to feel that she is an embarrassment. It is also important to acknowledge that she has given birth and as such she needs full postpartum nursing care. It is important that all staff acknowledge the birth and death and allow the woman and her family to talk about what happened as and when they wish.

**EXERCISE**

Discuss ways in which the distress of women who experience a pregnancy loss or the birth of a baby with an abnormality could be eased in your hospital.
Module 19. Reading

Postpartum depression and companionship in the clinical birth environment: A randomized, controlled study

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Johannesburg, South Africa

Objective: Postpartum depression is a common feature of childbearing and is the cause of considerable morbidity. We have explored the possibility that clinically oriented care during labour may contribute to its occurrence.

Study design: Of 189 nulliparous women labouring in a familiar community hospital, 92 were allocated by randomized, sealed envelopes to receive additional companionship from one of three volunteer labour companions recruited from the community.

Results: The group receiving support attained higher self-esteem scores and lower postpartum depression and anxiety ratings six weeks after delivery.

Conclusion: In the clinical labour environment companionship modifies factors that contribute to the development of postnatal depression. We emphasize the importance of paying attention to the psychosocial environment in which labour takes place to facilitate adaptation to parenthood (Am. J. Obstet. Gynecol. 1993; 168:1388–93.)

Keywords: Companionship in labour; postpartum depression

Of the various psychologic consequences of childbirth postpartum depression is regarded by many researchers and clinicians as the most clinically important (1–4). With greater clinical significance than transient postpartum “blues” (3) and considerably more common than overt postpartum psychoses (6, 7), postpartum depression comprises a group of poorly defined, depressive-type symptoms that have their onset in the early postpartum weeks or months and can persist for more than a year (8–10). The reported incidence ranges from 3% to 34%.

The clinical symptoms of postpartum depression are extensive and sometimes conflicting. Depression itself is not necessarily one of the leading symptoms (1, 2), although it is usually evident (3). Oppenheim (5) mentions exhaustion, irritability, avid weepiness as women’s main complaints, whereas Pitt (10) describes retardation of energy and motivation levels. Feelings of helplessness and hopelessness prevail, and anxiety is common (1, 2, 10).

Vegetative symptoms such as loss of libido (1, 10, 12), appetite disturbance (3), and sleep disturbance are usually present (5). Psychosomatic symptoms such as headache, asthma, backache, vaginal discharge and abdominal pain may be reported (3, 13). Cognitive symptoms, which may be more difficult to detect, may include obsessional thinking, fear of harming the baby or self (4), suicidal thoughts and depersonalization (10). Overt rejection of the baby may be an extreme reaction (1).
With early diagnosis and treatment the prognosis is good, and over two thirds of patients recover within a year. If treatment is delayed, depression may be prolonged (3).

According to Cooke (11), the single factor that has most strongly and consistently played a significant role in preventing postpartum depression is social support. In previous research social support has always been assessed during pregnancy or the postpartum period. To our knowledge, no studies have assessed the effect of social support during labour on the development of postpartum depression.

As the modern obstetric era has emerged, labouring women have been isolated more and more from the community supporters that were a feature of childbirth in preindustrialized societies (15). Although in recent years husbands have accompanied women in labour, little is known about the effect of their presence.

Obstetric care during the past few decades has moved closer to a view of labour as a high risk situation that necessitates restrictions being imposed on mothers because of the extensive, routinely applied clinical care. It is possible that the clinical environment of modern birth may have adverse effects on physiologic or psychologic outcomes. The study of Sosa et al. (16) on labour support and obstetric outcome provides support for the concept that emotional support during labour ameliorates the negative impact of the unfamiliar clinical environment of birth, at least in terms of obstetric outcome.

In this study we have extended this concept to apply to psychologic outcomes of the birthing experience and, in particular, to postpartum depression. We have investigated the hypothesis that confidence in one’s competence as a mother is an important contributor to the prevention of postpartum depression, that during labour women are uniquely vulnerable to environmental influences, that modern obstetric care has the effect of impairing women’s feelings of competence and therefore contributes to the development of postpartum depression, and that this process may to some extent be prevented by the provision of positive support and companionship during labour.

**Methods**

The study was conducted at Coronation Hospital, Johannesburg, a community hospital serving those unable to afford private medical care and catering primarily, although not exclusively, to women of Asian or mixed cultural origins. Advertisements were placed in local community centres asking for help from women prepared to act as labour supporters. The work would be voluntary although a nominal allowance to help with expenses would be paid (about US $6 per day). Three of the respondents were selected to act as labour companions. They were asked simply to stay with those labouring women to whom they were assigned as continuously as possible and to use touch and verbal communication to concentrate on three primary functions; comfort, reassurance, and praise.

Nulliparous women without significant obstetric complications in established labour with cervixes dilated <6 cm were asked to participate in the study. Only women who had no supportive companion of their own with them, as is common in this community, were invited to participate. The details of the study were explained, in particular that participants would have only a one-in-two chance of being accompanied during labour by a lay support person. Baseline clinical details of the participants were recorded, and a brief questionnaire about their current emotional state was completed. Participants were then allocated, by means of randomly ordered
cards in sealed opaque envelopes, to a study or a control group. Those in the study group were introduced to one of the supporters who then stayed, if possible, until the birth of the baby. Companions spent a minimum of 5 hours with women in the study group, with 64 of the women being accompanied throughout both labour and delivery and the remaining 28 for labour only. Participants were enrolled in the mornings only, as the supporters were not able to stay after dark. In all other respects the care received by both groups was identical. Clinical care was provided by the resident medical and nursing staff. The time nursing staff could spend with women in both groups was limited by the relatively small nursing complement in the busy labour ward. Details of the labour and delivery were obtained from the hospital notes.

Within 24 hours of delivery a structured questionnaire was administered by a clinical psychologist (W-L.W.) relating to perceptions of labour and pain experienced in labour and on day 1. In addition, measures of stable personality traits, such as maternal self-esteem (17) (Coopersmith Self-Esteem Inventory) and trait anxiety (18) (Speilberger State-Trait Anxiety Scale), were administered. For all but the last few questions, which related to the support received in labour, the interviewer was blind to the group allocation of each woman.

Although it would have been preferable to administer the self-esteem and trait-anxiety scales before enrolment, it was considered unethical to attempt to impose this additional burden on labouring mothers. Instead, these scales were administered within 24 hours of delivery on the assumption that such stable personality characteristics would probably not show evidence of any changes caused by the labour experience as soon as 24 hours after the event. This assumption was supported by the close correlation of these scores between the two groups.

Letters were written to the participants reminding them to attend the 6-week postnatal clinical, and if they failed to do so, further letters were sent and telephone calls made. At the postnatal visit, a further structured interview incorporating the Coopersmith Self-Esteem Inventory (17); the Speilberger State-Anxiety Inventory (18); attitudes toward motherhood, the baby, and the marital relationship; behaviour relating to infant care and motherhood; and the Pitt Depression Inventory (10) were administered.

For most of the questions reported here the interviewer was again blind to the group allocation, although occasionally the participants volunteered information that identified them as belonging to one or other group.

The baseline and outcome variables measured on day one and at six weeks postpartum were compared. Because the distribution of much of the data was nonnormal, statistical comparisons of continuous data were by the Mann-Whitney test. Proportions were compared by means of χ² analysis.

The research protocol was approved by the Committee for Research on Human subjects of the University of the Witwatersrand.

**Results**

Of the 190 women approached, 189 agreed to participate in the study and were randomly allocated to the support (N = 92) or to the control group (N = 97).

The randomization process succeeded in producing groups that were very well matched for all the baseline data recorded, except that there were more black women in the control than the
support group. The discrepancy did not reach statistical significance (P >0.08), and the numbers involved were considered too small to have materially altered the results (Table 1). One woman in the control group left the hospital before completing the 24-hour questionnaire and could not be traced. The number lost to follow-up at six weeks was 40 (21%). Because there was no discrepancy in the number lost from each group nor in the baseline variables between the groups who were followed up, the loss to follow-up was not considered to have introduced significant bias.

The clinical results have been considered in detail elsewhere (19). This report is concerned with the comparison of postpartum depression and closely related issues of self-esteem, anxiety and competence between the two groups.

Table I. Baseline information expressed as mean (SEM) or proportions (%)

<table>
<thead>
<tr>
<th></th>
<th>Study group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Mean (SEM) or proportion (%)</td>
</tr>
<tr>
<td>Recorded before randomization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (yr)</td>
<td>91</td>
<td>20.5 (0.56)</td>
</tr>
<tr>
<td>Gestation (wk)</td>
<td>92</td>
<td>39.4 (0.16)</td>
</tr>
<tr>
<td>Appearance of maternal distress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None or mild</td>
<td>92</td>
<td>39 (42.2%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>92</td>
<td>42 (45.7%)</td>
</tr>
<tr>
<td>Severe</td>
<td>92</td>
<td>11 (12.0%)</td>
</tr>
<tr>
<td>Mothers’ feelings before entry (strongly felt)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excited</td>
<td>91</td>
<td>42 (46.2%)</td>
</tr>
<tr>
<td>Worried</td>
<td>91</td>
<td>39 (42.9%)</td>
</tr>
<tr>
<td>Sad</td>
<td>91</td>
<td>14 (15.4%)</td>
</tr>
<tr>
<td>Afraid</td>
<td>91</td>
<td>42 (46.2%)</td>
</tr>
<tr>
<td>In pain</td>
<td>91</td>
<td>71 (78.0%)</td>
</tr>
<tr>
<td>Anxious</td>
<td>91</td>
<td>37 (40.7%)</td>
</tr>
<tr>
<td>Recorded on day 1 after birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unmarried</td>
<td>92</td>
<td>73 (79.3%)</td>
</tr>
<tr>
<td>Race</td>
<td>92</td>
<td>62 (67.4%)</td>
</tr>
<tr>
<td>Asian</td>
<td>92</td>
<td>12 (13.0%)</td>
</tr>
<tr>
<td>Black</td>
<td>92</td>
<td>7 (7.5%)</td>
</tr>
<tr>
<td>Racially mixed</td>
<td>92</td>
<td>73 (79.3%)</td>
</tr>
<tr>
<td>Education &gt; 10 years</td>
<td>92</td>
<td>58 (63.1%)</td>
</tr>
<tr>
<td>Previously employed</td>
<td>92</td>
<td>41 (44.6%)</td>
</tr>
<tr>
<td>Partner employed</td>
<td>90</td>
<td>67 (74.4%)</td>
</tr>
<tr>
<td>Household monthly income &lt; $400</td>
<td>92</td>
<td>67 (72.8%)</td>
</tr>
</tbody>
</table>

No statistically significant differences.

To assess their feeling of competence during labour, participants were asked whether they felt that they had coped well during labour. In the support group 54 of 92 responded positively compared with 23 of 96 control group women (p <0.001). Questions at six weeks designed to assess their feeling of competence as mothers also yielded more positive responses from supported mothers.

Measures of self-esteem supported these subjective assessments of confidence about the labour experience. Although self-esteem measures did not distinguish between control and supported groups on the day one assessment, supported mothers showed significantly higher self-esteem scores six weeks postpartum than did control group mothers (p <0.001). Mean scores on the Coopersmith Self-Esteem Inventory suggest that control group mothers’ self-esteem diminished between labour and six weeks postpartum, whereas supported mothers’ self-esteem increased during that period (Table II).
Postpartum depression scores at six weeks reflect a similar pattern. The mean depression score of control group mothers was 23.27 (SEM 1.28) and of supported mothers 10.4 (SEM 0.77) (p <0.001). Control group scores ranged from 0 to 45 and support group scores from 0 to 33.

Scores on the Pitt Depression Inventory were further divided into three categories: <20, between 20 and 34, and ≥35, representing low, moderate, and high depression ratings. This categorization is not appropriate as a clinical diagnostic definition of low, medium or high depression. For clinical diagnosis changes in scores over time are indicative of changes in depressive status. Categorization of scores on the Pitt scale was performed here only as a research technique to differentiate those women with higher or lower depression ratings at the time of assessment. Significant differences (p <0.0001) were found between the supported and control group women, with no women in the support group falling into the high depression category and most obtaining low ratings on the Pitt scale. Control group mothers, on the other hand, were frequently represented in both the moderate and high depression categories (Table III).

Although trait-anxiety scores did not distinguish between control and support group mothers on day one, they did show significantly lower anxiety levels among support mothers on both day one and at six weeks after delivery (Table IV), thereby supporting the postpartum depression finding.

It may be argued that support from members of the medical profession during labour or from family members and professionals in the weeks after birth differed between the control and supported mothers, thereby accounting for the observed differences in their psychologic adjustment. There were, however, no statistical differences between the perceptions of both instrumental and emotional support received from partners, the women’s mothers, doctors, or nurses during the woman’s hospital stay or in the six weeks thereafter.
Comment

The contribution of obstetric care to improved perinatal outcome is readily acknowledged with regard to the benefits of effective medical interventions in women with complications of pregnancy. Whether the application of widespread, clinically oriented care for healthy women has been equally beneficial is, however, open to debate.

It is important to question whether profound manipulations of the environment during childbirth may have unsuspected adverse effects on the birth process and, particularly, on adaptation to parenthood.

The findings of this study suggest that the clinically oriented management of labour in a hospital environment resulted in less psychologic adjustment six weeks postpartum in women who laboured without supportive companions. Providing nonprofessional but emotionally supportive companions for women during the hours of labour and delivery appeared to facilitate feelings of self-esteem and to diminish anxiety and postpartum depression scores in the weeks after delivery, even when the companions were previously unknown to the labouring women.

Companionship in labour had a striking effect on the woman’s feelings of self-confidence. If feelings of competence that are initiated during labour, a time of intense emotional impressionability, are of importance to a woman’s continuing sense of competence as a mother, then this finding is of considerable importance.

The possibility must be considered that those who received the labour support replied more positively to the interview questions from a desire to please the researchers. A good test of validity of the interview is given by the trait-anxiety questionnaire, which is designed to measure long-term anxiety and should not be affected much by recent events. The consistency of these scores indicates that subjective bias between the groups is most unlikely.

Further evidence for the validity of the measures is given by the increase in the difference between the self-esteem scores from 24 hours to six weeks after birth. Any bias resulting from a desire to please the researchers would tend to diminish with time. The actual increase in the difference implies a true and self-reinforcing effect on self-esteem.

To explain the pronounced and persistent effects on feelings and actions of a relatively short-lived intervention, we need to accept the premise that labour is a time of unique sensitivity to environmental factors and that events and interactions during labour may have far-reaching and powerful psychologic consequences. Given the fact that very few human experiences approach in intensity the levels of stress, anxiety, pain, exertion, and emotional tumult that occur during labour, this is not surprising.

<table>
<thead>
<tr>
<th></th>
<th>Support group</th>
<th>Control group</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SEM</td>
<td>Mean</td>
</tr>
<tr>
<td>Trait anxiety (day 1)</td>
<td>40.2</td>
<td>0.94</td>
<td>39.8</td>
</tr>
<tr>
<td>State anxiety (day 1)</td>
<td>28.29</td>
<td>0.85</td>
<td>37.8</td>
</tr>
<tr>
<td>State anxiety (6 weeks)</td>
<td>28.0</td>
<td>0.92</td>
<td>40.4</td>
</tr>
</tbody>
</table>

*Mann-Whitney test.*
How applicable are these results to other situations? The participants were nulliparous and primarily young, urban, working-class women who were politically and socially disadvantaged. Many were single. Most were from a community with a conventional Christian ethic. It would be expected that the results of our study would be directly applicable in most parts of the Western world at least to urban working-class women giving birth in a hospital setting. How best to adapt the principles established in this study to other communities or those with very different cultural mores will need further evaluation.

Within the setting of a familiar community hospital labour companionship was associated with an increase in self-esteem and a decrease in both postpartum depression and anxiety in the weeks after delivery. The improvements in these important aspects of postpartum adjustment highlight the value of paying attention to the human environment in which birth takes place.

We thank the nursing and medical staff of Coronation Hospital for clinical assistance and April Anderson and Amelia Smythe, Institute for Biostatistics, South African Medical Research Council, for statistical assistance.

REFERENCES


Module 19. Reading

Puerperal sepsis

Puerperal sepsis is defined as infection of the genital tract occurring at any time between rupture of the membranes (or onset of labour) up to and including the 42nd day postpartum. Features are:

- fever (oral temperature 38.5°C/101.3°F or higher) on any two of the first ten days postpartum;
- pelvic pain and abdominal tenderness;
- abnormal vaginal discharge (lochia) with a foul smelling odour;
- delay in uterine involution (<2 cm/day during the first eight days).

Puerperal sepsis is an important cause not only of mortality but also of subsequent infertility. It is estimated that 15% of all direct obstetric deaths are due to sepsis. Unclean delivery practices, prolonged rupture of membranes and/or labour are important factors in the development of subsequent sepsis. Puerperal sepsis is also related to the lack of trained assistance at delivery, to poor obstetric facilities, and to the number of invasive interventions (e.g. vaginal examinations) during labour.

Rooney (1992)

Differential diagnosis

<table>
<thead>
<tr>
<th>Fevers associated with childbirth caused by infectious agents</th>
<th>Fever associated with childbirth but not caused by infectious agents</th>
<th>Fevers occurring at the time of childbirth but not caused by childbirth</th>
</tr>
</thead>
</table>
| Sites may include:                                          | Low-grade temperature recordings are very common in the first 24 hours. Causes include dehydration, breast engorgement, and trauma. | Chest infections:  
  - pneumonia  
  - bronchitis  
  - pulmonary tuberculosis |
| • Lacerations or episiotomy                                  | • Temperature above 38.5°C within 24 hours should alert the midwife. | Malaria |
| • Endometritis                                               |                                                              | Typhoid |
| • Salpingitis                                                |                                                              | Dysentery |
| • Parametritis                                               |                                                              | Meningitis |
| • Generalized peritonitis                                    |                                                              | HIV/AIDS |
| • Abscess formation:                                         |                                                              | |
|  - tubo-ovarian                                             |                                                              | |
|  - broad ligament                                            |                                                              | |
|  - pouch of Douglas                                          |                                                              | |
|  - abdomen or chest                                          |                                                              | |
| • Septicaemia                                                |                                                              | |
| • Septic shock                                               |                                                              | |
| • Breast infections, mastitis                               |                                                              | |
| • Wound infections                                           |                                                              | |
| • Thromboembolic disorders:                                 |                                                              | |
|  - superficial phlebitis                                     |                                                              | |
|  - deep vein thrombosis                                      |                                                              | |
### Treatment/protocol

<table>
<thead>
<tr>
<th>Type 1 Health post</th>
<th>Puerperal sepsis</th>
<th>Other infections</th>
</tr>
</thead>
</table>
| Polyclinic Feldscher units | Give antibiotics Refers if:  
- No improvement in 48 hours  
- Woman very ill/sick | Investigate Treat as appropriate |
| Type 2 Health post | Give IV fluids if shocked  
Give antibiotics IV/IM Manage infected wound or remove retained placental fragments | Investigate Treat appropriately  
(Treat malaria according to policy) Refer to hospital if no improvement in 3 days Investigate and treat appropriately |
| Type 3 Health post | As above plus:  
Change or combine antibiotics if necessary Treat pelvic abscess, thrombophlebitis | Investigate and treat appropriately |
| Regional hospitals | | |

### Organisms most commonly causing puerperal sepsis

The organisms which most commonly cause puerperal sepsis are:

- Streptococci
- Staphylococci
- Escherichia coli (E coli)
- Clostridium tetani
- Clostridium welchii
- Chlamydia Trachomatis
- Neisseria Gonorrhoeae.

Organisms can be native to a site, such as the bacteria which normally line the vagina and rectum without causing harm, e.g. Lactobacilli, some types of Streptococci, E Coli and Staphylococci.

However, native organisms can become harmful and cause infection if conditions predispose to this:

- if they are introduced into the uterus by the examining fingers or by instruments used during pelvic examination;
- if there is considerable trauma and damage to the perineal and vaginal areas (e.g. lacerations);
- if there is prolonged rupture of the membranes with migration of organisms up the genital tract (chorioamnionitis).

### Exogenous organisms

Organisms can be introduced into the genital tract from the outside environment:

- by unclean hands/gloves
- by unsterile instruments
- by foreign substances that are inserted into the vagina (herbs, oil, etc)
- by sexual activity.
**Remember** that two extremely important causes of postpartum infection:
- tetanus
- sexually transmitted diseases

are **both** caused by exogenous organisms.

**Summary of important factors and conclusion**

- Puerperal sepsis is avoidable and can be prevented.
- Midwives and health care practitioners have a very important role in educating the community about hygiene, particularly at the time of delivery. Only clean hands and clean instruments should be used.
- Immunization programmes for women of childbearing age against tetanus.
- Early diagnosis and treatment of sexually transmitted diseases (STDs).
- Traditional practices which appear likely to cause infection should be discouraged.
- Inaccessibility of health facilities and lack of transportation.
- Good referral systems need to be in place.
- Status of women in the community may affect the health of women, predisposing to anaemia and malnutrition, both of which increase the risk of death from puerperal sepsis.
- Adequately trained personnel at all levels of the health care system are needed to recognize the signs and symptoms of puerperal sepsis.
- Adequate supplies of antibiotics are needed in health facilities.
MODULE 20.
INFANT FEEDING

At the end of this module participants should be able to:

- discuss the benefits of breastfeeding
- understand and implement the “10 steps to successful breastfeeding”
- understand the accepted contraindications to breastfeeding
- understand the International code of marketing of breast-milk substitutes.

Breastfeeding

A question commonly asked is: Why breastfeed? The Mother-baby package (WHO 1994) states that apart from its unquestioned nutritional superiority, breastfeeding protects against infant death and morbidity. Infants who are exclusively breastfed are likely to suffer only one quarter as many episodes of diarrhoea and respiratory infections as babies who are not breastfed.

Human milk has evolved over many thousands of years to meet the specific needs of human infants, just as the milk of other mammals has evolved to meet the specific needs of their young (Royal College of Midwives 1988). The World Health Organization has acknowledged that at least 97% of mothers are capable of breastfeeding their babies successfully. However, there are an increasing number of mothers who start breastfeeding and give up within a few weeks. The difference between those who succeed and those who do not is thought to be due to the systems of care in place for breastfeeding mothers rather than the mothers themselves. An Australian writer attributes a large part of the responsibility for breastfeeding failure to professional ignorance. A good helper is considered one of the most important elements of success.

The customs and practices of different cultures should be respected, but all mothers should be educated about the importance of breastfeeding and, in particular, the importance of colostrum. Colostrum contains vital antibodies that will protect the newborn baby from many infections. The more colostrum a baby can get, the better. In addition, it is important to feed the baby frequently in the first few days after delivery (with colostrum) in order to stimulate the production of the mother’s milk supply. Frequent feeding in the first few days will also prevent engorgement when the mother’s milk comes in.

Babies do not need any fluids other than breast-milk, or any solids, for about the first six months of life. This is called exclusive breastfeeding and is the WHO/UNICEF recommended form of infant feeding. At this point solids can be added to the baby’s diet while the mother continues to offer breast-milk until well into the baby’s second year of life. Not offering the baby other fluids in the first weeks of life is crucial to the promotion of successful breastfeeding. The mother’s supply of breast-milk is dependent on the amount of milk the baby drinks; the more the baby takes, the more the mother produces. If the baby’s stomach is filled with water, glucose or formula feeds, it will take less milk from its mother and the mother will, in turn, produce less milk. This will rapidly develop into a situation where the mother “has too little milk” and breastfeeding is likely to fail. The solution to the problem of a baby who takes very little at any one feed is to feed the baby more often.

Promoting and helping mothers to breastfeed has always been an important part of the midwife’s role in the postnatal period but is equally the responsibility of every health care provider who has
anything to do with postpartum mothers and infants. This includes obstetricians, paediatricians/ 
neonatologists, family practitioners, pharmacists, emergency care units, neonatal intensive care 
units, midwives and nurses.

EXERCISE
Participants are expected to bring with them statistics on the number of mothers who breastfeed and for 
how long.

Discuss the factors which predispose to the mother giving up breastfeeding. Be prepared to give feedback 
to the main group.

Many of the problems surrounding breastfeeding can be prevented with proper support. In 
response to the need to educate professionals and women and their families about appropriate 
methods of care for mothers and babies which support breastfeeding, WHO and UNICEF 
launched the Baby-Friendly Hospital Initiative (BFHI) in the early 1990s. This followed and 
supported the earlier development of the Code of marketing of breast-milk substitutes (see 
summary below), which was established and endorsed by the United Nations Member States 
from the early 1970s. Together these documents provide the basis for effective care of 
breastfeeding mothers. The basic principles of the BFHI are simply outlined in Effective care of 
the newborn and breastfeeding, Section 16 (WHO, 1994).

There is universal agreement between all involved in maternity care that an increase in the level 
of breastfeeding is desirable and that an improvement in the quality of care offered will lead to 
improvements in the rate and duration of breastfeeding.

Many of the problems associated with breastfeeding and failure to breastfeed are due to incorrect 
techniques and management of lactation. The most significant steps to take to overcome these 
difficulties are outlined in the “10 Steps” to successful breastfeeding which constitute the BFHI. 
These include:

1. Have a written breastfeeding policy that is routinely communicated to all health staff.
2. Train all health care staff in the skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers to initiate breastfeeding within half an hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation even if they should be 
   separated from their babies.
6. Give newborn infants no food or drink other than breast-milk, unless medically indicated.
7. Practise rooming-in – allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Do not give artificial teats or pacifiers (also called dummies or soothers) to breastfed 
   infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on 
    discharge from the hospital or clinic.

Much has been written about early breastfeeding difficulties. For example, many problems arise 
from the baby being incorrectly positioned on the breast. Problems such as sore or cracked 
nipples or a baby who cries after a feed or takes a very long time to feed are often due to poor
positioning. Babies are often positioned as though they have a bottle teat in their mouth with the baby’s mouth closed around the nipple itself rather than enclosing most of the areolar area. The sucking action from the breast is very different from that of a bottle and the two are not compatible, particularly in the first few days and weeks of a new baby’s life.

An exercise to demonstrate this is as follows: if you place a finger in your mouth as though it is a teat and suck it, your cheeks cave in as suction is created. If you suck on your forearm, in contrast, so that your mouth is full, the mouth and jaw action is different, involving all the muscles of the face with the mouth wide open. Some idea of the different positions of the baby’s mouth during breast and bottle-feeding can be gained from this exercise.

Getting feeding right needs patience and quiet surroundings, with the position of both the baby against the mother and of the mother herself being correct and comfortable. The baby’s body should be close to the mother’s body (skin-to-skin is the very best) with head and shoulders facing the breast and its nose at the same level as the nipple. The neck and head should be extended so that the nose is free. A baby that is properly attached will have a mouth full of breast, including the nipple and much of the areola. The baby’s tongue will protrude from its mouth and cup the breast from underneath; it is the action of the tongue pressing against the breast from below which encourages the milk lying within the breast to flow into the baby’s mouth. Breastfeeding is not a sucking action but one of suckling the breast to express the milk from it.

Restricting the feeds to a limited time at each breast was once common practice, on the grounds that this prevented sore nipples. Recent studies have shown that nipple soreness is not affected by the duration of a feed but is affected by incorrect positioning of the baby on the breast. In fact, unrestricted feeds are now recommended. Babies should be allowed to feed for as long as they wish and should release the breast themselves rather than be disturbed to end the feed. Babies can be fed from one breast at a time or from both if the baby wishes to take more after releasing the first breast.

**EXERCISE**

What regime is adopted in your unit for mothers who are breastfeeding? How long normally elapses between delivery and the first feed? How long does the mother normally feed her baby for on each breast? Be prepared to give feedback to the main group.

**Contraindications to breastfeeding**

There are hardly any contraindications to breastfeeding. Almost every mother and baby can be encouraged to breastfeed. Hospitals which endorse breastfeeding find that almost every mother is capable of breastfeeding exclusively from birth and of being discharged without her baby having ever received any alternative fluids (water, glucose or formula).

There are very few exceptions to this. Babies that cannot be breastfed are those with:

- galactosaemia (a rare condition occurring in about 1/50 000 babies);
- babies of mothers who are taking anti-cancer drugs or who are being treated with radioactive substances.

Cases where adjustment or supplementation may be required include babies with:
- (rare) inborn errors of metabolism (such as phenylketonuria, maple syrup urine disease), who must be monitored for toxin serum metabolite levels for possible adjustment in the management of breastfeeds;
- very low birth weight at less than 1000 g or 32 weeks, who may require supplementation in addition to breast-milk;
- severe dysmaturity with potentially severe hypoglycaemia, or who require therapy for hypoglycaemia, and who do not improve through increased breastfeeding or by being given breast-milk;
- acute water loss, who may require water supplementation in addition to more frequent breastfeeding.

Some drugs may be incompatible with breastfeeding. These are listed in the WHO/UNICEF document on *Breastfeeding and maternal medication*. Alternative drugs which are compatible with breastfeeding are listed in this manual.

Most other babies can be breastfed or fed with breast-milk. Difficult deliveries, admission of the baby to a neonatal intensive care unit or of the mother for special care and observation are not usually sufficient reasons to withhold breastfeeding, or at least breast-milk, from the baby. If a baby is well enough to feed it is usually preferable, and less energy-consuming for the baby, for it to receive a breastfeed. If the mother is severely ill it may be preferable to assist her to express her milk and for this to be given to the baby by cup until she is well enough to put the baby to her breast herself.

Babies should not be given formula feeds before being breastfed for the first or any other time.

**Summary: International code of marketing of breast-milk substitutes**

The code includes these ten important provisions:

1. No advertising of products under the scope of the code to the public.
2. No free samples to mothers.
3. No promotion of products in health care facilities, including the distribution of free or low-cost supplies.
4. No company representatives to advise mothers.
5. No gifts or personal samples to health workers.
6. No words or pictures idealizing artificial feeding, including pictures of infants, or on the labels of the products.
7. Information to health workers should be scientific and factual.
8. All information on artificial feeding, including the labels, should explain the benefits of breastfeeding and all costs and hazards associated with artificial feeding.
9. Unsuitable products such as sweetened condensed milk should not be promoted for babies.
10. All products should be of a high quality and take account of the climatic and storage conditions of the country where they are used.

Refer to WHO/UNICEF publications on Breastfeeding and the Baby-Friendly Hospital Initiative for further information.
By the end of this module participants should be able to guide women in choosing an appropriate family planning method which suits their needs.

**Family planning**

Family planning is a basic human right and a component of implementing an effective care programme.

It is important that mothers and their partners are given advice about safe methods of contraception so that they can make an informed choice rather than using abortion as a means of contraception or fertility regulation. Family planning advice and use will strengthen maternal care services by preventing unwanted pregnancies and by reducing the increased likelihood of illness or death from repeated abortion. Ensuring access to family planning information is a key element of the WHO *Mother-baby package*.

The training of health care workers must include training in the methods of contraception available plus the interpersonal and counselling skills required to help a family make an informed choice.

It is important that the health care worker has a knowledgeable and supportive approach to counselling about sexuality and contraception. The purpose of discussions with women/couples is to determine the most appropriate method of contraception to suit the woman or couple’s sexual habits and to discover any contraindications to the various forms of contraception. The health care worker must develop a heightened sense of awareness, to recognize anxiety (which is often expressed non-verbally). If anxieties have been expressed, opportunities must be given to explore these further.

**EXERCISE**

What information does the health care worker require from the woman or couple to facilitate an appropriate choice of contraceptive method?

The factors influencing an individual’s choice of method vary enormously. The ability of clients to understand a method must also be considered.

**Available methods of family planning**

The information below is a brief summary of essential issues related to various contraceptive methods. Family planning advisers should endeavour to obtain more extensive texts on contraceptive methods and family planning advice before practising. The following is included to provide the essential issues needed for those advising women regarding possible contraceptive techniques in association with pregnancy and the postpartum period.

**Natural methods of family planning**

These are defined by WHO as methods of achieving or avoiding pregnancy by observing the natural signs and symptoms of the fertile and infertile phases of the menstrual cycle.
Breastfeeding
Breastfeeding is endorsed as a postpartum method of contraception with a safety margin of about 98%, provided a number of conditions are followed. To be effective, breastfeeding may be used as a contraceptive until about six months after delivery provided that:

- the baby is exclusively breastfed
- intervals between feeds are never longer than six hours, including night feeds
- the mother’s periods have not returned
- the baby is less than six months of age.

If any of these conditions are not met, breastfeeding is no longer an adequate contraceptive. It may continue to provide some protection against pregnancy, but an additional contraceptive method should be used.

Periodic abstinence
There are a number of techniques of natural family planning which involve periodic abstinence (avoiding intercourse during the fertile phase of the menstrual cycle). These include:

- the basal body temperature method
- the cervical mucus method (Billings)
- the calendar or rhythm method
- the sympto-thermal method.

A significant proportion of couples find it difficult to predict or accurately identify the onset and end of the fertile phase. They may also take chances when practising periodic abstinence and break the rules. There are very high failure rates which fluctuate from 10–30 pregnancies for every 100 users each year.

Periodic abstinence has the following advantages and disadvantages:

Advantages:
- there are no physical side effects;
- couples learn more about their sexual physiology and gain a better understanding of their reproductive function;
- the responsibility for family planning is shared by both partners, which may lead to increased communication between them;
- after training many users are able to practise the method without additional assistance and at no additional cost;
- medically qualified persons are not required for the delivery of services.

Disadvantages:
- the method is highly dependent on the commitment and cooperation of both partners, which may be difficult to achieve;
- use–effectiveness is lower than that of most other contraceptive methods;
a relatively long initial training method is needed: women may become pregnant during this time;

- long periods of sexual abstinence may lead to marital difficulties and psychological stress;
- women who have irregular cycles find the method difficult to use;
- signs and symptoms which may predict fertility are highly variable during breastfeeding.

**Contraindications:**

- none.

Adolescents (who experience anovulatory cycles frequently and who may find abstinence difficult to comply with when required) and pre-menopausal women (whose cycles become erratic) may find natural family planning methods particularly difficult to comply with.

**Basal body temperature**

The temperature is taken daily on waking and recorded on a chart. During the early part of the cycle the temperature remains at a low level but following ovulation under the influence of progesterone the temperature rises 0.2°C and remains at a high level until the next period. The post-ovulatory infertile phase starts after the third recording at the higher level.

**Cervical mucus (Billings method)**

Immediately after a period a woman experiences dryness in the vagina. This is the pre-ovulatory infertile period as the body prepares for ovulation under the influence of estrogen. At the time of ovulation the cervical mucus plug liquefies and the woman experiences a sticky sensation in the vagina. The first day of the mucus is the start of the fertile phase. The mucus increases in volume until the woman is aware of a wetness at the vaginal entrance. After ovulation the mucus decreases in volume and the woman will be aware of dryness indicating the post-ovulatory phase. The infertile period occurs four days after the last day of fertile mucus. This is often called the Billings method.

**The calendar or rhythm method**

This involves numerical calculations based on previous menstrual cycles to estimate the fertile period. It has a high failure rate since it relies on past information to predict the length of future cycles, which has limited accuracy.

**The sympto-thermal method**

This combines various periodic abstinence methods, especially cervical mucus changes, the calendar method and the basal body temperature method. The use of multiple methods is more accurate than any one method for identifying the fertile phase of the menstrual cycle and the required days of abstinence can be kept at a minimum.

**Barrier methods of family planning**

Barrier methods of contraception prevent pregnancy by blocking the entrance of sperm into the uterine cavity. Some of the barrier methods, particularly condoms, help to protect against sexually transmitted diseases, including HIV infection.

**Advantages:**

- safety (a major advantage)
they have only a few local side effects
there are no medical contraindications to their use
most are available without medical prescription.

Disadvantages:
lower use–effectiveness compared with hormonal methods, IUDs and sterilization.

Barrier methods include condoms, diaphragms and spermicides.

The male condom (sheath) is a rubber tube rolled onto an erect penis. It must be applied before any genital contact takes place as often some semen escapes before ejaculation. The condom also gives some protection against sexually transmitted diseases and cervical cancer. (An oil-based lubricant must not be used.)

The female condom is a relatively new barrier method of contraception. Femidom is a soft polyurethane sheath which lines the vagina. It has an inner ring which is used for insertion and holds the sheath in place beyond the pubic bone and an outer ring which lies flat against the labia. The Femidom can be inserted easily, just like inserting a tampon, it can be inserted before sexual intercourse and is not reliant on the male erection. Femidom has proved to be an effective barrier to both sperm and to bacteria and viruses which can cause infections and sexually transmitted diseases, including HIV.

The diaphragm is a rubber dome which forms a barrier in the vagina between the semen and the cervix. The woman must be individually fitted with a diaphragm and shown how to insert it prior to intercourse. If the mother has used a diaphragm prior to pregnancy she must be refitted six weeks after delivery when the vagina and pelvic floor muscles have regained their tone.

Some of the barrier methods, such as diaphragms, can be used with spermicides to give added protection. They are not usually recommended for use on their own.

Intra-uterine contraceptive device (IUCD/IUD)
The intra-uterine contraceptive device (IUD) is a safe and effective method of reversible contraception. IUDs are small flexible devices made of metal and/or plastic: some are copper-bearing and newer versions release progesterone. They are long-acting, providing protection for 5–10 years depending on the type used. They may be used until menopause.

The IUD prevents pregnancy by a combination of methods including:
inhibition of sperm migration in the upper female genital tract;
inhibition of ovum transport;
inhibition of fertilization;
the levenorgestral-releasing IUD, in addition to the above, causes changes in the amount and viscosity of the cervical mucus, inhibiting sperm penetration.

The IUD may be particularly effective for women who
are parous and want a highly effective, long-acting and reversible method;
prefer a method which does not require action daily or with every act of sexual intercourse;
• are breastfeeding;
• may have difficulty obtaining regular contraceptive supplies;
• lack privacy, making other methods problematic;
• in the course of using other (e.g. hormonal) methods become high risk users (e.g. they develop peripheral vascular disease);
• do not want to have any more children but do not want to be sterilized.

Contraindications:
• cancer of the uterus, cervix or ovaries;
• congenital uterine abnormalities or benign tumours of the uterus (fibroids) which distort the cavity in a manner incompatible with proper IUD placement;
• recurrent or chronic pelvic inflammatory disease, or a history of IUD-related pelvic inflammatory disease.

IUDs have been used for many years. The IUD can be inserted at any time during the menstrual cycle provided the woman is not pregnant. There are some advantages to insertion during a menstrual period as it is less likely that the device will be inserted into a pregnant uterus, insertion may be easier and any bleeding related to the insertion is less likely to cause anxiety. The mother should be encouraged to feel for the threads at the end of each period to ensure the device is still in place.

Hormonal methods
Hormonal methods provide millions of users with safe and effective contraception. All hormonal methods are systemic in nature and are based on either a progesterone combined with an estrogen or a progesterone alone. Hormonal methods can be obtained in pill form, as injectables and as subdermal implants.

Hormonal contraceptives are appropriate for women who:
• want a highly effective method of contraception;
• are motivated and willing to use a contraceptive that requires daily action and will be able to obtain supplies on a regular basis;
• may benefit from some of the ancillary health effects of hormonal contraceptives in relation to factors such as anaemia from heavy menstrual bleeding, a history of ectopic pregnancy, painful menstrual periods, recurrent benign ovarian cysts, or are at risk or have a history of acute pelvic inflammatory disease and have a family history of ovarian cancer.

Contraindications:
Hormonal contraceptives should not be used by women who have:
• venous thromboembolic disorders
• complicated valvular heart disease
• moderate or severe hypertension (blood pressure >160/100)
• hypertension with vascular disease
• focal migraine
- malignancy of the breast
- liver tumour (benign or malignant)
- severe cirrhosis
- diabetes with vascular complications.

*Combined oral contraceptive pill*
Estrogen and progesterone suppress follicular-stimulating hormone and luteinizing hormone production, so that ovarian follicles do not mature and ovulation does not take place. Progesterone also causes thickening of the cervical mucus, making penetration by spermatozoa difficult. The endometrium is also rendered unsuitable for implantation.

One pill is usually taken daily for 21 days. Vaginal bleeding due to hormonal withdrawal should occur during the following seven pill-free or dummy pill days.

The mother must be aware that if she misses taking a pill, additional contraceptive methods must be used for seven days. If the mother has diarrhoea and/or vomiting, additional precautions must also be taken as her protection may be reduced. A mother who is on antibiotics or any other medication must consult her doctor about possible interactions with the oral contraceptive.

*Injectable contraceptives*
Injectable contraceptives have proved popular. There are two injectable contraceptives which are widely available, both progestogenic steroids given by intramuscular injection:
- Depo-Provera, which is normally given every 12 weeks
- Noristerat, which is given every 8 weeks.

The most widely used is Depo-Provera. It has been used by over ten million women and has the lowest failure rate.

Other forms of hormone treatment include subcutaneous implants such as Norplant, but these are only available in some countries.

*Voluntary sterilization*
Female and male sterilization (also known as tubal occlusion or tubal ligation and vasectomy) are among the most effective contraceptive methods available. Sterilization is also one of the safest methods with low mortality and complication rates for both men and women. The sterilization procedure blocks either the sperm ducts (the vasa deferentia) or the oviducts (fallopian tubes) to prevent the sperm and ova from uniting.

Sterilization is appropriate for:
- clients who have completed their desired family size;
- women who have health problems that are a contraindication for future pregnancy or to the use of other family planning methods.

*Contraindications:*
- none, although:
– sterilization is generally not reversible, so that any doubts about the wish for permanent contraception should be carefully considered;
– there is still a small risk of failure.

Female sterilization is a safe and well accepted procedure which can be accomplished by ligation, sometimes with resection, or mechanically with clips or rings. It is usually done by means of laparotomy or laparoscopy under local anaesthetic. Vasectomy is a simple procedure also performed using only local anaesthesia.

**Emergency contraception**

Emergency contraception is used in emergency situations to prevent an unintended pregnancy following an unprotected act of sexual intercourse. It is sometimes referred to as “the morning after pill”. This is confusing, however, as the contraceptive is not necessarily a pill and can be used within three days (pill) or five days (intrauterine device – IUD) after unprotected intercourse. Emergency contraception is thought to prevent ovulation, fertilization and/or implantation and is thus not a method of abortion.

**Emergency contraceptive pills**

Combined estrogen and progesterone pills can be taken in a regimen known as the Yuzpe method.

- When pills containing 50 µg ethinyl estrodiol and 0.5 mg norgestrol (0.25 mg levenorgestral) are available, 2 pills should be taken as the first dose as soon as convenient but no later than 72 hours after unprotected intercourse, followed by another two pills 12 hours later.
- When only pills containing 30 µg ethinyl oestrodial and 0.30 mg norgestral (0.15 mg levenorgestral) are available, four pills should be taken as the first dose as soon as convenient but no later than 72 hours after unprotected intercourse, followed by another four pills 12 hours later.
- When the only pills available are progesterone-only containing 0.30 mg levenorgestral, 20 pills each dose are required.

Side effects may include nausea, vomiting, irregular interuterine bleeding, tender breasts, headaches and dizziness.

**Contraindications:**

- no known contraindications, and no effect on a diagnosed pregnancy.

Counselling on contraception is appropriate if emergency contraception is needed.

**Counselling regarding contraceptive use**

A person advising women or couples about the use of contraceptives must take care to find the best method for the people concerned. Individual preference, frequency and spontaneity of intercourse, whether or not the relationship is one which allows for cooperation in contraceptive use, and the woman’s reactions to various kinds of contraceptives will all influence the choice of method. Care must be taken to explore these issues sensitively with the woman or couple in order to find out which method is best for them. Specialists on contraceptives and contraceptive
counselling should be routinely available to advise women about contraception following pregnancy.

**HOMEWORK**
Identify the statistics from your own unit or place of work which demonstrate the different forms of contraception used.

**EXERCISE**
Discuss the statistics previously identified and the policy in your unit. How can these statistics be improved to increase the practice of child-spacing by 50% and decrease the practice of abortion by 50%. Be prepared to give feedback to the main group.
MODULE 22.
POSTNATAL CHECK

At the end of this module participants should be able to:

- conduct a postpartum check-up
- offer appropriate support, advice and counselling regarding future pregnancies
- assist the woman and her family to adjust to life with a new baby.

The six-week postnatal examination is usually carried out by a doctor or midwife and marks the end of the routine childbirth-related health care. It is useful to give the mother a checklist of possible problems to complete (Table 22.1).

<table>
<thead>
<tr>
<th>Table 22.1 Checklist for six-week postnatal examination</th>
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<tbody>
<tr>
<td>Backache</td>
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<td>Stress incontinence</td>
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<tr>
<td>Haemorrhoids</td>
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<tr>
<td>Constipation</td>
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<tr>
<td>Fatigue</td>
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<tr>
<td>Breast pain</td>
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<td>Perineal pain</td>
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<td>Depression</td>
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<td>Painful or difficult intercourse</td>
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<tr>
<td>Headaches</td>
</tr>
<tr>
<td>Bowel problems</td>
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<tr>
<td>Dizziness or fainting</td>
</tr>
</tbody>
</table>

The mother’s general physical and emotional state should be checked, particular attention being paid to symptoms of anaemia, urinary tract infection or of emotional distress or depression. A physical examination must be carried out of the breasts, abdomen and pelvis to ensure that uterine involution is complete and that any trauma sustained during delivery is fully healed. The mother is asked if she has any stress incontinence of urine, if she has resumed intercourse and if there is any discomfort. Mothers should be encouraged to attend the postnatal examination as failure to do so could affect future pregnancies.

This is also a good time to explore the woman’s adjustment to both her pregnancy and delivery experience as well as her adjustment to parenthood and to her marriage and life with a new baby. Fears, concerns or anxiety about these experiences can influence a woman’s view of her baby, her partner and herself and negative perceptions can have severe and long-lasting effects. Talking through the issues, and perhaps clarifying some misunderstandings, can have a most beneficial effect and can do much to explain “rights” and “wrongs”. It is worth taking a little time to accomplish such enduring effects.

This is even more crucial if there has been a negative outcome to the pregnancy. A woman who has given birth to a baby with some abnormality or has lost her pregnancy will still require postpartum care but will be in even greater need of sensitive counselling. Referral to specialist for counselling help should always be considered and perhaps offered in these situations. Alternate wards if at all possible.
EXERCISE

Participants should discuss their roles in the postnatal check. List each professional's role and give feedback to the main group.
MODULE 23.
RECORD-KEEPING

At the end of this module participants should:

- understand the importance of keeping accurate records
- know the value of home-based maternity records
- be aware of the need for accurate record-keeping in the postnatal period.

**Reading**
Home-based maternity records

Participants should be asked to bring one or two copies of the antenatal and postpartum records which they use in their practice to this session. They must remove any identifying information from them to maintain patient confidentiality.

**Record-keeping in practice**

Record-keeping is an important aspect of caring for mothers.

Good records:

- assist in continuity of care
- assist with the communication of women’s requirements for care between care givers
- reduce the risk of errors in drug administration and treatment
- focus attention on early signs of complications
- place on record significant observations and conclusions.

Poor records:

- impair continuity of care
- impair communication between staff
- increase the risk of errors being made, either by duplication or omission
- fail to identify deviations occurring
- fail to place on record significant observations and conclusions.

Effective records provide:

- concise, current and accurate information regarding the condition and care of the woman being cared for;
- a record of problems and actions taken regarding her;
- evidence of care, including interventions by professionals and the woman’s responses;
- evidence of factors which have affected the woman;
- information that supports standard-setting, quality of care assessments and audits of care;
- a record of baseline observations against which improvement or deterioration can be measured.
To be effective records must:

- be made as soon as possible after the event to which they refer has occurred;
- identify risk factors for the woman or fetus;
- provide evidence for the use of professionals with specific skills to whom the woman is referred;
- aid in the involvement of the woman in her own care;
- provide evidence that can be used for the protection of staff should a complaint be made;
- be written in a way that the woman can understand.

When writing records it is important to ensure that the record is:

- written legibly and in an indelible pen, not a pencil
- clear and unambiguous
- dated, timed and signed
- not abbreviated and does not include meaningless phrases or offensive remarks;
- alterations are scored out rather than crossed or blanked out.

GROUP WORK

In specialty groups, consider each entry on the records you have brought in relation to the criteria discussed above for good record-keeping, and identify the following:

Where the record-keeping is good
Where there are weaknesses and what is required to correct the weaknesses.

Home based maternal records (HBMR)

Good HBMR can help the management of pregnancy.

Early detection of potential problems and prediction of pregnancies where there is a risk of complications potentially threatening to the life or health of the mother, her baby or both, begin with good records.

Worldwide research tells us that predicting potential problems by identifying at-risk pregnancies has not always been helpful in reducing childbirth-related mortality or morbidity surrounding childbirth. However, these research studies demonstrate that where accurate and reliable records are kept, the monitoring of individual pregnancies can be improved which enables problems to be detected early.

For HBMR to be effective they must:

- be easily available for use by all concerned with care
- be comprehensive and contain all relevant information
- be easily understood by all members of the health care team
- be easy to complete
- give information quickly.
Research shows that the usefulness of records in pregnancy is improved if mothers retain the records themselves. Various studies have shown that mothers who retain their own records rarely lose them (and less often than hospital records are lost), and the quality of the information in the records is increased. Critics of the idea had feared that health care personnel would be unwilling to put relevant information in records that were held by the mothers. In fact, the reverse proved true; the records were more likely to be complete if the mother carried them herself.

The type and content of maternity records varies from country to country. WHO has produced an HBMR guide which outlines the basics of such records. A short extract is included in your pre-workshop reading pack.

**GROUP WORK**

In small groups, discuss the benefits of mothers keeping their own records to the following:

a) the mother
b) the hospital/clinic
c) yourself as the care giver.

**Benefits of HBMR**

The benefits to mothers are that they:

- feel included in the care because they hold the records;
- are more likely to understand what is happening to them, find it easier to ask about what is contained in the records;
- are more likely to receive help and assistance from family and community, by virtue of carrying the tangible record of the pregnancy; the record can become a symbol and a talking point with their partner and relatives;
- are more likely to receive speedy and efficient care, since the records are immediately available; because the records are less likely to be lost (totally or in part), all the vital information is available;
- have greater flexibility in attending any clinic when necessary – if, for example, a mother is away from home and is taken ill or feels that something is wrong;
- enjoy carrying their own records.

The benefits to the clinic/hospital are that:

- it does not have to store the records during the pregnancy;
- it does not have to employ staff to fetch or transport notes;
- it always has the information when the woman comes for care;
- because the records are standardized all the staff will understand them and find them easy to use;
- the quality of the service the hospital offers will be improved because the monitoring of pregnancies is improved.

The benefits to the health care provider are that:

- the pregnancy is easier to monitor;

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all the records are available at each of the patient’s visits;
- because the records are standardized they are easier to use;
- changes in the state of the woman are easier to identify because all the relevant information is in one record;
- referrals are easier, especially if all hospitals/clinics use the same type of record, reducing the need for time-consuming referral documentation;
- the record acts as a focal point for discussion with and education of mothers;
- the record facilitates interactions between care givers;
- the record allows for better care of women, with greater satisfaction for mothers.

**EXERCISE**

Look at the case study you brought with you. Try to plot all the antenatal information on a graph using only one side of a sheet of paper. Ask yourself:

a) Does it look better?
b) Would problems have been identified earlier if a single sheet of data could be made available?

Further work on your own:

If you do not have HBMR in your area you might like to spend some time thinking how you could develop a record that would meet the needs of midwives, mothers, obstetricians and your local hospital/clinic. Who can you approach to talk about this? How would you make progress in convincing your managers that HBMR were a valuable resource?

**Record-keeping in the postnatal period**

Detailed records must be kept at all times and recordings must be made as soon after the event as possible. A variety of records and notes are kept during this period. In some countries these records are now being entered into a computer. Other records are designed to encompass individualized care.

An initial assessment of the woman can lead to a systematic approach to the recording of postpartum events. This enables the care giver to identify the woman’s potential and actual problems. Individualization is central to the care process, rather than applying routine procedures to all women.

Soon after the birth the mother and the care giver should meet to plan care and to set their goals for this care. The actions required to reach these goals are then determined. At the end of the care episode the care giver evaluates whether the care given has reached the goals set. The evaluation should include the mother’s perception of the care received and whether she felt that the care was effective and acceptable to her and her family. The actions should not only conform to good professional standards but also respect the right and dignity of the woman and her family within their cultural context.

A holistic approach to health care is recommended for most mothers throughout the antenatal, intrapartum and postpartum periods (Figure 23.1). This involves caring for the emotional, social and intellectual needs of mothers at the same time as caring for her bodily needs and those of her baby.
ESSENTIAL ANTENATAL, PERINATAL AND POSTPARTUM CARE

ASSESSMENT
Identify actual and potential problems and potential problems against essential physical and psychological needs

PLANNING
Document both actual and potential problems
Goal-setting: identify action to be taken

A SYSTEMATIC APPROACH TO HOLISTIC CARE

EVALUATION
Establish how far the goals that were originally set have been achieved

EXERCISE
Using the principles of a systematic approach to midwifery care, as described above, design records that could be used in your unit or community.

What kinds of care are often neglected in your hospital and what can you do to overcome this?

REMEMBER:

Once a series of goals has been negotiated between the patient and the care giver the resources available should be considered. The environment and the availability of personnel and equipment is likely to determine the care that can be implemented in the next stage. A number of alternative strategies may therefore be used in patient care in order to achieve the stated goals. If the expected outcomes have not been achieved by the evaluation stage, the patient and care giver should conduct a reassessment, identifying the particular areas of difficulty.
Module 23. Reading
Home-based maternity records (HBMR)

The following is a summary of the information contained in the WHO publication *Home-based maternal records: Guidelines for development, adaptation and evaluation* (WHO, 1994).

Home-based maternal records are used throughout the world in the search for appropriate ways to reduce high maternal, perinatal and neonatal mortality and morbidity rates. This simple yet effective tool has been widely and successfully used in almost all countries over the last 30 years, with the content, layout and language used varying from country to country. The records were designed after the visible success of growth charts. Once growth charts had been universally accepted, interested parties began work to find a similar tool that could be used to monitor pregnancies. They have since been adapted to include further information, including educational messages and nutritional advice.

WHO prepared a prototype. This has now been extensively modified and field-tested in a WHO collaborative study of 20 centres in 14 different countries.

**Aims**

The aims of the WHO prototype HBMR were:
- to help in the early detection of risk conditions;
- to promote timely referrals of “at-risk” cases to appropriate health centres and hospitals;
- to improve the monitoring of health status during pregnancy, childbirth, the postnatal period and the inter-pregnancy periods, for up to 8–10 years;
- to increase the participation of the mother, her family and community in their own health care.

(Source: *Home-based maternal records*, p. 3)

In most countries the prototype is printed on both sides of an A4 card. This is then folded for ease of carrying by the mother.

It contains the following information:
- the woman’s personal details, name, address, marital status, next of kin
- present health
- present pregnancy
- past pregnancy
- methods of contraception used in the inter-pregnancy period
- information on periods before first pregnancy and inter-pregnancy period
- risks noted during previous pregnancies
- general notes, place for referral notes.

Wherever possible graphs and tick boxes are used to reduce the amount of writing required. This makes for quicker record completion.
In most countries the health worker completes the records. However, in countries where literacy rates are high, mothers may be encouraged to fill in the record themselves. In this way, records become a means by which mothers can both diagnose and care for themselves.

**Advantages**

The WHO collaborating centres that have used the HBMR have found the following advantages.

- They can act as reminders to women and their partners to take preventive measures against risk conditions and to make necessary arrangements for transportation should referral to higher levels of maternity care become necessary. They also serve to remind women and their partners to complete courses of tetanus toxoid, to follow up recommendations on diet and breastfeeding, and to comply with follow-up advice on management of “at-risk” conditions.
- All the collaborating centres found that the use of HBMR increased attendance at clinic.
- Women reported greater satisfaction when using these records and found it useful to have a record of and reminder about their own health care and that of their baby.
- Home-based records help by detecting problems early and by channelling those women most at need to referral centres, thereby increasing effective utilization of these facilities.
- Community workers and leaders also found the records useful to identify those women who might be in need of assistance and transportation.
- Both mothers and health workers found that health checks carried out in pregnancy required less time, as less needed to be written. This in turn reduced waiting times and helped to reduce overcrowding of the facilities.
- WHO also found that collection of information was made easier and more systematized. Important information was easy to abstract from the form and therefore the information was more likely to be reliable. There was not only a strengthening of the referral system but also an improvement in relationships at institutional level and between referral centres and the community. Health workers developed more confidence in the tool, which in turn enhanced the professional confidence of the members of the team who used the records. In short each began to trust the other’s findings and team members were increasingly likely to act on recorded findings, rather insisting on repeating the findings themselves.
- Vaccination uptake increased.

**Adapting the HBMR**

WHO recognized that records which were locally adapted and produced were more effective than simple reproduction of the WHO prototype. Locally produced records were more likely to meet local needs, more likely to be in the appropriate language and more likely to be understood by everyone and accepted by mothers and health workers.

From the work they did WHO could offer some lessons about adapting HBMR:

- *do not copy* the WHO prototype without adapting it to meet local needs and translating it into the local language;
- *do not* include so much information that the records look cluttered and confusing;
do not design records containing written material alone for use in areas where literacy among women and community health workers is low;

do not incorporate risk factors that are uncommon or difficult to recognize or that cannot be managed easily and affordably;

do not include health actions for problems that are not important or not supported by local health policy;

do not request duplicate records; there should only be one copy so everyone knows that the one they are using is the correct one;

do not use colours or a language alien to the local culture;

do not include subject matter that requires much writing;

do not print large quantities of records before pre-testing the format.

Further advice included making sure that the front page was well-designed and attractive, and that the printing was of good quality.

**Drawing up and completing HBMR**

The WHO guidelines also include advice for drawing up and completing HBMR, stressing the need for writing good guidelines for the people who will be using them. It may be necessary to produce different sets of guidelines for different groups of workers, so that each can have the explanations in a language and in terms with which they are familiar.

There is a clear need for adequate preparation and in-service training programmes before the records can be introduced.
At the completion of this module, participants should have:

- considered the rationale for locally written protocols;
- discussed the way in which protocols might be written locally in their own environment;
- analysed in detail protocols for the management of severe pre-eclampsia/eclampsia and for haemorrhage;
- considered whether locally written protocols are relevant to local needs and, if so, how they would be created.

In the United Kingdom, for example, very few maternity services would attempt to function now without protocols, and not one would even begin to contemplate the idea of using protocols written by and for another hospital. Yet in many countries there has been a tendency, at national or regional level, to prescribe in a very precise manner the clinical activities of professionals. Although this has some appeal to planners from the perspective of control, there is a real problem in that it may (and frequently does) significantly reduce the motivation of local professionals by removing their identification with local clinical issues. These activities are, after all, the reason for the professionals’ existence. It is inherently likely, therefore, that locally derived, evidence-based and multidisciplinary protocols will have advantages over the alternative prescriptive – and distant – models.

The main theme of this module is the need for good quality, well-researched and inter-professionally acceptable protocols for the management of specific problems in labour. High quality care is only possible if management is correct and up to date, communication between professionals is excellent, and clear usable protocols for management exist and are used. This is particularly important for the care of high risk cases. Different professional groups (midwives, obstetricians, paediatricians, anaesthetists and others) must be able to meet and discuss cases together at set times.

The design of a protocol must be emphasized. Written by local professionals, with input from all the relevant professional groups, it is important that protocols are not published until there is full agreement and they have been passed as acceptable by representatives of women’s groups. Naturally there will be input into protocols from higher sources of knowledge, such as professional institutes or medical schools, but the final decision about the detailed content of a protocol has to be a local one.

Protocols are not carved out of stone; they must include dates by which they are to be revised.

Participants should consider whether the model of locally written protocols is relevant to local needs.
EXERCISE

In this exercise participants will analyse detailed protocols (currently used by a maternity service in the United Kingdom) for use in severe pre-eclampsia/eclampsia and haemorrhage.

These protocols do not pretend to describe the only possible way to handle these situations clinically. The precise details of the clinical management are – in this context – not particularly important, especially since some or many of the technologies and medications may not at the moment be available to participants in their own practice.

The reason for presenting these protocols for discussion is that they indicate one way of addressing the challenge of ensuring that all members of the maternity team provide high quality care. The protocols promote understanding of what is to be done by which professionals (obstetrician, midwife and anaesthetist) and why it is being done. Furthermore, because there are very clear protocols, there is no room for confusion when professionals hand over care to their colleagues at the end of the duty sessions.

Participants should analyse in some depth the contents of the protocols, looking at why the various issues are covered in this way. They are encouraged to disagree with any or all of the protocols, working towards a local design of a protocol that would better suit local (and national) conditions.

Participants will discuss whether protocols are relevant to local needs, and if so how they might be produced.
MODULE 25.
AUDIT: BASIC PRINCIPLES OF CLINICAL AUDIT

At the completion of this module, participants should have:

- considered the potential benefits that could come from well organized clinical audit programmes;
- discussed the possible applicability of clinical audit to local circumstances.

What is audit?*

This section describes in detail what is meant by perinatal audit and how it can be undertaken at local, regional, national, or international level.

Clinical audit has been defined as the “systematic critical analysis of the quality of care, including the procedures used for prevention, diagnosis and treatment (including prevention), the use of resources and the outcome and quality of life for the patient”. In this context, “clinical” applies to the work of professionals giving care. It includes doctors, midwives, nurses, optometrists, audiologists, physiotherapists, speech therapists, social workers and other professionals.

Perinatal audit may therefore be defined as the systematic, critical analysis of the quality of perinatal care, including the procedures used for diagnosis and treatments the use of resources and the resultant outcome and quality of life for women and their babies.

Setting the standard for audit

Before an audit can be undertaken, it is necessary to agree the standard of care against which the practice under review is to be compared. Ideally the standard should be determined by reviewing the literature for the results of randomized controlled trials. If such evidence is not available in all cases a consensus of best practice must be made. It must be remembered that as audit is a dynamic process, the standard may therefore be changed in the light of new evidence.

The audit spiral

The dynamic process of audit can be presented as a spiral (Figure 25.1). Once standards have been defined, current practice is reviewed, the standard is set and change is implemented. The process is repeated to ensure that the desired change has occurred.

* Source: Perinatal Audit. A report produced by the European Association of Perinatal Medicine edited by P.M. Dunn, Bristol UK and G. McIlwaine, Glasgow UK
It is a well recognized fact that it is very difficult to make clinical professionals enthusiastic about audit when they first experience it. However, what seems at first unexciting – even dull – and a time-consuming exercise in counting, soon becomes an essential part of ensuring that the quality of a service is maintained and improved. It also helps to keep the service in contact with the users – mothers and their families.

Many clinicians worry that clinical audit is simply a mechanism for policing clinical activity. The way to prevent that from occurring is clearly to ensure that the output from the clinical audit process is seen to be constructive and productive.

Audit is a systematic, formal way to measure and improve the quality of patient care. It is a process of examining any clinical practice to determine if it is appropriate and beneficial. Usually the impact on patient wellbeing is a primary outcome of the practice which must be assessed (and not simply its incidence).

**Types of audit**

**Basic clinical audit**

This involves auditing a broad range of indicators routinely recorded in clinical notes or computerized information systems. While not strictly audit in the pure sense, it is often the first step and may be useful for determining which topics should be audited.

**Random notes**

This method involves random selection of sets of notes for independent peer review. It is predominantly used for auditing, structure and process. Its most appropriate application is probably for looking at the way case notes are completed, rather than auditing specific aspects of care.
Prospective process audit

This involves a checklist for a particular patient to ensure that all procedures in a protocol have been undertaken, with a further set of protocols advising what to do in the case of abnormal results. This can be time consuming to develop and is difficult to run efficiently without being computerized.

Topic audit

This involves selecting a particular topic which is the subject of wide variation or of local concern. It may involve additional data collection to assemble information related to the specific topic chosen and to answer predetermined questions.

Adverse event monitoring

This is a particular form of topic audit and is the routine audit of all cases where an adverse outcome has occurred, e.g. maternal death, perinatal death, severe maternal or neonatal morbidity.

Criteria for selecting topics for audit

When selecting topics for audit the following criteria must be met:

1. The topic must be significant either because it leads to a serious outcome, it occurs frequently or because management of care appears to deviate from normal;
2. The topic must be clearly defined and the definition must be agreed by all those taking part in the audit;
3. It must be feasible to undertake the audit;
4. There must be potential to make changes as a result of audit.

Structure, process and outcome

Clinical care can be audited by considering:

1. Structure: the resources available for care including the staff, equipment and facilities available and their organization.
2. Process: the utilization of these resources in the provision of health care.
3. Outcome: the result of the health care process.

In perinatal care, the situation is more complicated because there are both mothers and children to consider. Although structure and process are important and are related to outcome, the focus of this document is on outcome and associated outcome variables for women and children which can be compared at an international level.

Associated variables

Associated variables are those which may be directly related to outcome. For example, if chronic lung disease was being considered as one of the outcome measures for children, the associated variables might be extreme preterm birth, respiratory disease and prolonged ventilation.
Levels of audit

Audit may be undertaken

1. Locally, auditing variations within a unit or trends over time;
2. Regionally or nationally, auditing time trends or variations within a region or country;
3. Internationally, looking at differences between countries:
   - Words such as “stillbirth” and “live birth” are used in all countries and are defined by international bodies, notably WHO and FIGO. Despite this, the legislation relating to registration of births and the definitions used for registration vary between countries.
   - There are also conditions that are clearly defined in the International Classification of Diseases (ICD) and accepted in all countries but are not uniformly used in common parlance. For example, in the tenth revision of the ICD, a vaginal tear extending to the rectum and involving the rectal mucosa is clearly defined as a 4th-degree tear and allocated the code 070.3 (ICD 10 Vol I page 750). Nevertheless, clinicians commonly refer to this as a 3rd-degree tear. Wherever possible, pre-existing definitions, agreed by these international organizations, should be used. Outcome indicators and intermediate variables relating to these outcomes for both women and children should then be considered and agreed.

Where possible, use existing data

The information required for audit will depend on the audit topic. Wherever possible, routinely collected data should be used, with additional data collected only if required. Countries vary their range and type of data collection systems. The main types are described below.

Audits should ideally be initiated from within an organization rather than from above; the workers in the organization often know the weak points better than those above them.

EXERCISE

In small groups, design an audit to examine one clinical practice in your unit that you are concerned about.

Design an audit to assess a clinical practice that you think is going well. Consider exploring women’s perceptions of this practice as part of your audit plan.

(Some of the concepts for this module are adapted from Getting ahead with clinical audit – a facilitator’s guide 1994).
MODULE 26.
SYNOPTIC TABLES OF INTERVENTIONS:
EFFICACY OR NON-EFFICACY

At the completion of this module, participants should have:

- become somewhat concerned about their current practice in the light of the tables;
- hopefully been reassured that many western countries fail consistently to practise in accordance with the principles seen in this book and other similar publications;
- been encouraged to audit their own and their institution’s practice rigorously to see exactly where they stand;
- been encouraged to remain in contact with organizations that promote the widespread acceptance of maternity practice that conforms with the evidence available and rejects discredited practice.

Reading:

If asked to name the most important publication in the last several decades in maternity care, a great many leaders in the professions of obstetrics and midwifery would point to *Effective care in pregnancy and childbirth* (Chalmers, I. 1989). This book, published in the United Kingdom in 1989 and edited by an Englishman (Chalmers), a Canadian (Enkin) and a Belgian (Keirse), revolutionized the way most of us look at maternity care. Adopting a rigid format for evaluating what such professionals do in their professional roles and inspecting the evidence in support of interventions, it challenged so many assumptions that it is accurate to say that maternity practice has been forever changed for the better by its publication. It has now been followed by a computerized version and is subject to regular updates (The Cochrane Collaboration). It is used as an essential reference source by all maternity services that have access to it.

This module is not intended to be a substitute for the act of reading the book or accessing the computer programmes. Instead it is intended to give participants a thirst for the real thing (not a substitute).

Participants may wish to look at some of the lists and pick out some of the statements which seem most surprising to them for discussion.

[The facilitator must have a copy of the *Guide to effective care in pregnancy and childbirth* in order to refer to it in this module.]
Extract from Chapter 50 of Effective care in pregnancy and childbirth: a synopsis

The underlying thesis of this book is that evidence from well controlled comparisons provides the best basis for choosing among alternative forms of care in pregnancy and childbirth. This evidence should encourage the adoption of useful measures and the abandonment of those that are useless or harmful.

In this final chapter we have tried to summarize the main conclusions reached in earlier chapters. This summary takes the form of six tables which list the following:

1. beneficial forms of care
2. forms of care that are likely to be beneficial
3. forms of care with a trade-off between beneficial and adverse effects
4. forms of care of unknown effectiveness
5. forms of care that are unlikely to be beneficial
6. forms of care that are likely to be ineffective or harmful.

Tables 1 and 6 are based on clear evidence from systematic reviews of randomized trials. Tables 2 and 5 are based on information from reviews of controlled trials or good observational evidence, but for which the conclusions cannot be as firmly based as those for Tables 1 and 6. Table 3 lists forms of care with both beneficial and adverse effects, which women and care givers should weigh according to their individual circumstances and priorities; and Table 4 lists forms of care for which there are insufficient data or data of inadequate quality on which to base a recommendation.

We have been explicit about our criteria for choosing which table to use for each intervention, but there is inevitably some subjectivity in our choice. We worked from two basic principles: firstly that the only justification for practices that restrict a woman’s autonomy, her freedom of choice and her access to her baby would be clear evidence that these restrictive practices do more good than harm; and secondly that any interference with the natural process of pregnancy and childbirth should also be shown to do more good than harm. We believe that the onus of proof rests on those who advocate any intervention that interferes with either of these principles.

A tabulated summary such as this is necessarily selective. Nuances discussed in the chapters cannot find full expression in summary tables. Nevertheless, we hope that the explicit form in which these conclusions have been stated will be useful, and that the advantages of this summary approach will outweigh its drawbacks.

The inclusion of a particular form of care in Tables 1 or 2 does not necessarily imply that it should always be adopted in practice. Research based on the study of groups may not always apply to individuals, although it should be relevant to guide broad policies of care. Forms of care listed in Tables 5 and 6 may still be useful in particular circumstances, although, once again, they should be discouraged as a matter of policy. Practices listed in Table 3 will require careful consideration by the individuals concerned, while those in Table 4 should usually be avoided except in the context of trials to better evaluate their effects.
Some of the conclusions that we have reached will be controversial, but they must be judged in the light of the methods used by our colleagues and ourselves to assemble and review the evidence on which they are based. While we have made great efforts to ensure that the data presented are comprehensive and accurate, it is possible that errors and misinterpretations have crept in. We conclude by reiterating the invitation extended to readers in our first edition, to bring omissions and mistakes to our attention for inclusion and correction in the Cochrane database of systematic reviews and in later editions of this book.
Table 1. Beneficial forms of care

Effectiveness demonstrated by clear evidence from controlled trials

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**Table 2. Forms of care likely to be beneficial**

The evidence in favour of these forms of care is not as firmly established as for those in Table 1

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Anti-D immunoglobulin to rhesus-negative women sustaining abdominal trauma
Intrauterine transfusion for a severely affected isoimmunized fetus
Routine screening for and treatment of syphilis in pregnancy
Rubella vaccination of seronegative women postpartum
Screening for and treatment of chlamydia in high prevalence populations
Caesarean section for active herpes (with visible lesion) in labour with intact membranes
Prepregnancy counselling for women with diabetes
Specialist care for pregnant women with diabetes
Home instead of hospital glucose monitoring for pregnant women with diabetes
Ultrasound surveillance of fetal growth for pregnant women with diabetes
Allowing pregnancy to continue to term in otherwise uncomplicated diabetic pregnancies
Careful attention to insulin requirements postpartum
Encouraging diabetic women to breastfeed
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Delaying planned Caesarean section for placenta praevia until term
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Vaginal culture after prelabour rupture of membranes preterm
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Allowing labour to progress after spontaneous onset in prelabour rupture of membranes preterm
Elective delivery for prelabour rupture of membranes preterm with signs of infection
Amnioinfusion for fetal distress thought to be due to oligohydramnios in labour
Short-term indomethacin to stop preterm labour
Offering induction of labour as an option after fetal death
Vaginal prostaglandin E for induction of labour after fetal death
Prostaglandin analogues for induction of labour after fetal death

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Respecting women’s choice of companions during labour and birth
Respecting women’s choice of place of birth
Presence of a companion on admission to hospital
Giving women as much information as they desire
Change of mother’s position for fetal distress in labour
Intravenous betamimetics for fetal distress in labour to “buy time”
Woman’s choice of position for the second stage of labour or giving birth
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Women and care givers should weigh these effects according to individual circumstances and priorities

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Table 5. Forms of care unlikely to be beneficial

The evidence against these forms of care is not as firmly established as for those in Table 6

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MODULE 27.
STRATEGIES TO IMPLEMENT LOCALLY APPROPRIATE INTERVENTIONS

It will by now be clear that this workshop is designed to be critical of the design and function of modern maternity care provision, wherever in the world it may be. This criticism is not of a destructive nature; instead it is designed to focus attention on the deficiencies in order to generate enthusiasm for solving the problems.

In line with this philosophy, this module is designed to encourage discussion. It is suggested that the participants be divided into smaller groups, preferably no more than six in each group, in order to create productive group working.

This module is possibly one of the most important in the workshop. The exercises are intended to be very provocative. Different subgroups will respond in different ways and there is some merit in occasionally asking different subgroups to address the same questions, in order to compare and contrast the responses.

It is important that enough time is allocated to this module. Experience suggests that a half a day is the minimum and flexibility is important.

[Note for trainers:
Trainers must be provocative in this module. Subgroups will tend to provide uncontroversial answers to many of the suggestions. The trainer should encourage groups to confront the faults. There is often a tendency (in all countries) to drift into general criticism of government (or Ministry of Health) policies. While these criticisms may be valid, there is still much work that individual health care professionals and maternity services can do. Draw out constructive, realistic and achievable proposals from the participants. Experience suggests that some participants may not even realize that they can play a role in the process of improving the situation.]

GROUP WORK
In small groups, address the following issues:

Plan the development of protocols: which should be developed first, by whom, and with what available modern information?

How will you ensure that protocols are used once they are developed, and are revised as needed?

How can you involve users (women and their families) more in maternity services? How will you make services more user-friendly?

How can you make sure your users are better informed about pregnancy, labour and the postpartum period?

Design some simple audits for your maternity service.

Decide on five priority areas for change that you believe are realistic and manageable in your maternity service.

How will you motivate your staff to be enthusiastic and proud of their work?

It is hoped that by the end of this module participants will have left the workshop with some constructive ideas for revision and redesign of their maternity services.
If any participants leave the workshop feeling that none of the concepts in this workshop are relevant to their own practices, it is a cause for considerable congratulation since it implies that their service is in an excellent condition to meet the challenges of the twenty-first century. It is, however, rather more likely that participants will leave with many new ideas. Some of these will be relevant to you now, some will be relevant in the future and some will never be relevant. This is entirely normal; how could maternity services be identical wherever in the world we are?

It is to be hoped that the underlying parallel three philosophies of reducing unnecessary interventions (“de-medicalizing” care), listening to the wishes of the users (mothers and their families), and introducing evidence-based, effective care will form the basic foundations of modern maternity care all over the world. If this workshop encourages some participants to sign up to these concepts it will have fulfilled its purpose.
REFERENCES AND MATERIAL USED FOR PREPARING THIS WORKSHOP


CLARKE, R. Nursing standard. Midwifery feedback from Russia, 7(23): 52 (1993).


WHO Material


Основы ухода за новорожденными и грудное вскармливание Essential newborn care and breastfeeding. Copenhagen, WHO Regional Office for Europe, 1996.


Рождение ребенка в Европе Having a baby in Europe. Copenhagen, WHO Regional Office for Europe, 1985 (Public Health in Europe, No. 26).


Opening the gates to life. Geneva, World Health Organization (video explaining how the Mother-baby package can be used).

We would appreciate it if you would complete an evaluation of the course on the following form. Please give your responses for all topics covered in the programme.

There are no right or wrong answers. Your own perceptions are important to us as a way of improving our programme for future delegates.

DO NOT PUT YOUR NAME ON THIS FORM. YOUR ANSWERS ARE TO BE COMPLETED ANONYMOUSLY.

Thank you for your help.

**Participant Ratings:**

Please rate each session according to the scale indicated in the table:

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Timing of the course:

Please rate the course in terms of the time devoted to each kind of activity:

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Please add any additional comments here:

What suggestions can you make for improving the course in the future?
DEFINITIONS AND INDICATORS IN

FAMILY PLANNING
MATERNAL & CHILD HEALTH
AND
REPRODUCTIVE HEALTH

USED IN THE WHO REGIONAL OFFICE FOR EUROPE

Family and Reproductive Health
World Health Organization
Regional Office for Europe

Revised March 1999
Overview

This compilation of definitions and indicators is based on current definitions from several sources. Where more than one definition or indicator is available, additional sources are included. In addition, formulas are indicated when calculations are necessary. It should be noted that these definitions and indicators are under continuous use and evaluation and are subject to change.

A

Abortion
Termination of pregnancy (expulsion or extraction of embryo/fetus) before 22 weeks of gestation or below 500 g of weight (1).

Abortion rate. The estimated number of abortions per 1000 women aged 15–44 years in a given year.

Abortion ratio. The estimated number of abortions per 1000 live births in a given year.

Induced abortion or the voluntary termination of pregnancy, is used to end an already established pregnancy (i.e. a method that acts after nidation has been completed). Unsafe abortion is defined as a procedure for terminating an unwanted pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards or both. (2)

Adolescence, youth and young people
The term “adolescence” has been defined as including those aged 10–19, and “youth” as those aged 15–24; “young people” is a term that covers both age groups, i.e. those between the ages of 10 and 24. True adolescence, however, being the period of physical, psychological and social maturing from childhood to adulthood, may fall within either age range. (3)

Adolescent reproductive health
The goal of overall improved adolescent reproductive health involves: more responsible and equitable relationships between young men and young women before and during marriage; decreased incidence of pregnancy before maturity; lower rates of exposure to and contraction of sexually transmitted diseases; and improvement in the status of women.

The means by which adolescent reproductive health is achieved include: improvement in the knowledge and understanding among all key groups of society – including young people themselves – of the physical, psychological and social aspects of adolescent reproductive health; increased training of key people with influence on adolescents, and of adolescents themselves, in counselling and communication skills; promotion of policies and programmes that reflect the best ways of meeting the reproductive health needs of adolescents, with emphasis on young people as a resource for health and provision of alternatives to early childbearing for young women, including better education to improve their status. (3)

Apgar score
Evaluation of a newborn’s physical status by assigning numeric values (0 to 2) to each of the five criteria: 1) heart rate, 2) respiratory effort, 3) muscle tone, 4) response to stimulation, and 5) skin colour. A score of 8 to 10 indicates the best possible condition.

Apgar score (low): 6 at five minutes as a percentage of all live births. (4)
Definitions and Indicators

B

Birth (see also live birth)
The complete expulsion or extraction of a dead fetus of more than 500 g or of a live fetus from its mother irrespective of the duration of pregnancy. (5)

Birth rate (or crude birth rate)
The number of births per 1000 population in a given year.

Birth weight
*The weight of a neonate determined immediately after delivery or as soon as thereafter as feasible; it should be expressed to the nearest gram.* (6)

For live births, birth weight should preferably be measured within the first hour of life before significant postnatal weight loss has occurred. While statistical tabulations include 500 g groupings for birth weight, weights should not be recorded in those groupings. The actual weight should be recorded to the degree of accuracy to which it is measured.

The definitions of “low” (less than 2500 g – up to and including 2499 g), “very low” (less than 1500 g – up to and including 1499 g) and “extremely low” (less than 1000 g – up to and including 999 g) birth weight do not constitute mutually exclusive categories. Below the set limits they are all-inclusive and therefore overlap (i.e. “low” includes “very low” and “extremely low”, while “very low” includes “extremely low”).

If known, at least 500 g (1000 g), otherwise, gestational age at least 22 weeks or body length crown/heel at least 25 cm). (7)

*Birth weight for perinatal statistics.* By weight intervals of 500 g, i.e. 1000–1499 g, 1500–1999 g, etc. (8, p. 63)

Breastfeeding
Feeding a baby by allowing him/her to suck at the mother’s breast.

Exclusive breastfeeding rate (**EBFR**). Proportion of infants under 4 months of age who are exclusively breastfed. (5) This indicator includes breastfeeding from a wet nurse and feeding on expressed breast-milk.

\[
\text{EBFR} = \frac{\text{Infants aged under four months (less than 120 days) who were exclusively breastfed in the last 24 hours}}{\text{Infants aged under four months (less than 120 days)}}
\]

*Source: (5)*

**Predominant breastfeeding rate (**PBFR**): The proportion of infants under four months of age who are predominantly breastfed. (5)

\[
\text{PBFR} = \frac{\text{Infants aged under four months (less than 120 days) who were predominantly breastfed in the last 24 hours}}{\text{Infants aged under four months (less than 120 days)}}
\]

*Source: (5)*

Timely complementary feeding rate (**TCFR**): Proportion of infants 6–9 months of age who are receiving breast-milk and complementary foods. (5)
Infants aged 6–9 months (180–299 days of age) who received complementary foods in addition to breast-milk in the last 24 hours

TCFR = \frac{\text{Infants aged 6–9 months (180–299 days) who received complementary foods in addition to breast-milk in the last 24 hours}}{\text{Infants aged 6–9 months (180–299 days)}}

Source: (5)

**Continued breastfeeding rate (CBFR) (2 years):** Proportion of children aged 20–23 months who are being breastfed. (5)

CBFR = \frac{\text{Children aged 20–23 months who were breastfed in the last 24 hours}}{\text{Children aged 20–23 months}}

Source: (5)

**Bottle-feeding rate:** proportion of infants less than 12 months of age who are receiving any food or drink from a bottle with a nipple/teat. (5)

BFR = \frac{\text{Infants aged under 12 months (less than 366 days) who were bottle-fed in the last 24 hours}}{\text{Infants aged under 12 months (less than 366 days)}}

Source: (5)

C

**Caesarean section**
Abdominal delivery of the baby by laparotomy and section of the uterus. (1)

**Caesarean section rate:** as % of all deliveries. (4)

**Causes of death**
The causes of death to be entered on the medical certificate of cause of death are all those diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced any such injuries. (9, 10)

**Contraceptive prevalence**
Percentage of couples using a contraceptive method, either modern or traditional.

CPR = \frac{\text{Contraceptive methods use}}{\text{Couples (100 women of fertile age)}}

**Congenital disorders**
Those diseases that are substantially determined before or during birth and which are in principle recognizable in early life. Congenital malformation should be confined to structural defects present at birth, the term “congenital anomaly” being used to include all biochemical, structural and functional disorders present at birth. (11)

**Cost–benefit analysis**
The systematic comparison (in monetary terms) of all the costs and benefits of proposed alternative schemes with a view to determining: (a) which scheme or combination of schemes will contribute most to the achievement of predetermined objectives at a fixed investment; or (b) the magnitude of the benefit that can result from schemes requiring the minimum investment. The resources required per unit of benefit must be determined, account being taken of the fact that costs and benefits accrue with time. (11)
Definitions and Indicators

**Crude birth rate**
Annual number of births per 1000 population. (12, p. 98)

**Crude death rate**
Annual number of deaths per 1000 population. (12, p. 98)

**D**

**Delivery**
The process by which fetuses are born. A twin delivery thus counts as one delivery and two births. (4)

**Detection of multiple pregnancy rate**
Detected before delivery as a percentage of all multiple pregnancies. (4)

**Direct obstetric deaths**
See Maternal death.

**E**

**Early neonatal mortality rate**
Deaths at 0–6 days after live birth × 1000 live births. (4)

\[
\text{ENMR} = \frac{\text{Live births} \times 1000}{\text{Live births}}
\]

*Source: (13)*

Age classification for early neonatal deaths: (i) under 1 hour, 1–11 hours, 12–23 hours, 24–47 hours, 48–71 hours, 72–167 hours; (ii) under 1 hour, 1–23 hours, 24–167 hours. (7)

*Note: Age at death during the first day of life (day 0) should be recorded in units of completed minutes or hours of life. For the second (day 1), third (day 2) and through 27 completed days of life, age of death should be recorded in days. (9,10)*

**Eclampsia**
Convulsions and coma occurring in a pregnant or puerperal woman and associated with pre-eclampsia, that is, a condition in pregnancy manifested by hypertension, oedema and/or proteinuria. (1)

**Eclampsia rate.** Eclampsia in pregnancy, during delivery or postpartum as a percentage of all deliveries. (4)

**Epidemiological survey**
A survey, which may use a screening (q.v.) test but whose principal aim is not to bring patients to treatment but to elucidate the prevalence, incidence and natural history of a disease under study (although case-finding is a natural by-product of such surveys). Also known as a population survey. (11)

**F**

**Family**
The United Nations General Assembly in its resolution 44/82 of 8 December 1989, proclaimed 1994 as the International Year of the Family with its theme of “Family: resources and responsibilities in a changing world”. No attempt was made by the United Nations to define or delineate the “ideal family” or to direct “family policy” to specific goals. The concept of family is not easy to define.
The family has been variously described as the nucleus and pillar of society and the natural bridge between the individual and society. The status of the family has also been referred to by the United Nations Committee on Civil and Political Rights. In commenting on Article 23 of the International Covenant on Civil and Political Rights, the Committee noted that:

… the concept of the family may differ in some respects from State to State, and even from region to region within a State, and that it is therefore not possible to give the concept a standard definition. However, the Committee emphasizes that, when a group of persons is regarded as a family under the legislation and practices of a State, it must be given the protection referred to in article 23. (14)

**Family planning**

Implies the ability of individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births. Family planning is achieved through contraception, defined as any means capable of preventing pregnancy, and through the treatment of involuntary infertility. The contraceptive effect can be obtained through temporary or permanent means. Temporary methods include: periodic abstinence during the fertile period; coitus interruptus (withdrawal); using the naturally occurring periods of infertility (e.g. during breastfeeding and postpartum amenorrhoea); through the use of reproductive hormones (e.g. oral pills and long-acting injections and implants); placement of a device in the uterus (e.g. copper-bearing and hormone-releasing intrauterine devices); and interposing a barrier that prevents the ascension of the sperm into the upper female genital tract (e.g. condoms, diaphragms and spermicides). Permanent methods of contraception include male and female sterilization. *(Working definition used by the Special Programme of Research and Research Training in Human Reproduction, and the Division of Family Health.)*

**Fertility regulation**

Is the process by which individuals and couples regulate their fertility. Methods that can be used for this purpose include, among others, delaying childbearing, using contraception, seeking treatment for infertility, interrupting unwanted pregnancies, and, in the case of mothers with an infant or a small child, breastfeeding. *(Working definition used by the Special Programme of Research and Research Training in Human Reproduction, and the Division of Family Health.)*

**Fertility (replacement level).** The level of fertility leading to a stable population size (no demographic increase or decline).

**Fertility rate (total) (TRF).** The average number of children that would be born alive to a woman during her lifetime if she were to pass through her childbearing years conforming to the age-specific fertility rates of a given year. The rate refers to a synthetic female cohort. It is computed by the summation of the age-specific fertility rates. The total fertility rate is also used to indicate replacement level fertility; in the more developed countries, a rate of 2.1 is considered to be replacement level. *(15)*

**Fertilization and conception**

The concepts of fertilization and conception are often confused. Fertilization refers to the union of an ovum and a sperm. Conception has been defined by the American College of Obstetrics and Gynecology as occurring at the time of implantation of the fertilized ovum into the wall of the uterus, i.e. that point in the biological development corresponding to the beginning stages of a unique biological organism. The above distinction between fertilization and conception is used by the United States National Institutes of Health in establishing various guidelines relevant to research in human reproduction. *(Working paper prepared and reviewed by WHO on The Definition of a Child: Implications for Maternal and Child Health Programmes with particular reference to the Convention on the Rights of the Child. Geneva, World Health Organization.)*

**Fetal death**

Death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the
fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. (7)

_Early fetal death._ Death at less than 20 completed weeks of gestation. (16)

_Intermediate fetal death._ Death at after 20 but before 28 or more completed weeks of gestation. (16, Report on the Second Session including reports on the First Sessions of the Subcommittees on Definition of Stillbirth, Registration of Cases of Cancer, and Hospital Statistics)

_Late fetal death._ Death at 28 or more completed weeks of gestation. (16)

_Rationale:_ distinction among intrauterine deaths, antenatal deaths and fetal deaths during delivery is necessary to identify avoidable deaths (in principle, fetal deaths during delivery belong to this group) and to analyse the problem better.

_Implications_ for the quality of antenatal and delivery care.

_Fetal death rate prior to admission._ Intrauterine deaths after 22 completed weeks before admission to hospital as a percentage of all >22 week pregnancies. (4)

_G_

_Gestational age_

The duration of gestation is measured from the first day of the last normal menstrual period. Gestational age is expressed in completed days or completed weeks (e.g. events occurring 280–286 completed days after the onset of the last normal menstrual period are considered to have occurred at 40 weeks of gestation).

Gestational age is frequently a source of confusion, when calculations are based on menstrual dates. For the purposes of calculation of gestational age from the date of the first day of the last normal menstrual period and the date of delivery, it should be borne in mind that the first day is day 0 and not day 1; days 0–6 therefore correspond to “completed week zero”; days 7–13 to “completed week one”; and the 40th week of actual gestation is synonymous with “completed week 39”. Where the date of the last normal menstrual period is not available, gestational age should be based on the best clinical estimate. In order to avoid misunderstanding, tabulations should indicate both weeks and days. (7)

_H_

_Health_

“A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity”. (11)

_Hospital_

A hospital is a residential establishment which provides short-term and long-term medical care consisting of observational, diagnostic, therapeutic and rehabilitative services for persons suffering or suspected to be suffering from a disease or injury, and for parturients. It may or may not also provide services for ambulatory patients on an outpatient basis. (11)

_Hysterectomy_

Removal of the uterus.

_Hysterectomy rate after delivery._ Hysterectomy within two days after delivery as a percentage of all deliveries. (4)
Indirect obstetric deaths
See Maternal death.

Infant mortality rate (IMR)
Annual number of deaths of infants under 1 year of age per 1000 live births. More specifically this is the probability of dying between birth and exactly one year of age. \((12)\)

\[
\text{IMR} = \frac{\text{Deaths under the age of 1 year after live birth} \times 1000}{\text{Live births}}
\]

Source: \((13)\)

Infertility
Inability to conceive.

*Primary infertility* means that the couple has never conceived, despite cohabiting and failure to become pregnant, despite efforts to conceive after two year of regular unprotected sexual intercourse.

*Secondary infertility* means that the couple has previously conceived, but is subsequently unable to conceive despite cohabitation and attempts to become pregnant for a period of two years. If the woman has breastfed a previous infant, the two year time span should be calculated from the end of lactational amenorrhea.

Instrumental delivery rate
Forceps or vacuum extractor as % of all deliveries. \((4)\)

Late neonatal mortality rate (LNMR)
Deaths at day 7–27 after live birth \times 1000 live births. \((4)\)

\[
\text{LNMR} = \frac{\text{Deaths at 7–27 days after live birth} \times 1000}{\text{Live births}}
\]

Source: \((13)\)

Life expectancy at birth
The number of years newborn children would live is subject to the mortality risks prevailing for the cross-section of population at the time of their birth. \((12)\)

Live birth
The complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered liveborn. \((7)\)

Note: For live births, birth weight should preferably be measured within the first hour of life before significant postnatal weight loss has occurred. While statistical tabulations include 500 g groupings for birth weight, weights should not be recorded in those groupings. The actual weight should be recorded to the degree of accuracy to which it is measured. \((9, 10)\)
Definitions and Indicators

M

**Major congenital malformations rate**
According to a specified list as % of all births. (4)

**Maternal death**
The death of a women while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. (9, 10, 17)

**Maternal death (late):** A late maternal death is the death of a woman from direct or indirect obstetric causes more than 42 days but less than one year after termination of pregnancy. (7)

**Direct obstetric deaths.** Deaths resulting from obstetric complications of the pregnant state (pregnancy, labour and the puerperium) from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above (expressed as rate per 1000 live births). (9, 10, 17)

**Indirect obstetric deaths.** Deaths resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiological effects of pregnancy (expressed as rate per 1000 live births). (9, 10, 17)

**Maternal mortality ratio**
Annual number of deaths of women from pregnancy-related causes per 100 000 live births. (12)

**Maternal mortality rate**
Annual number of deaths of women from pregnancy-related causes per 100 000 women of childbearing age.

**Maternity care**
The object of maternity care is to ensure that every expectant and nursing mother maintains good health, learns the art of child care, has a normal delivery and bears healthy children. Maternity care in the narrower sense consists in the care of the pregnant women, her safe delivery, her postnatal care and examination, the care of her newborn infant and the maintenance of lactation. (11)

**Midwife**
A person who, having been regularly admitted to a midwifery educational programme duly recognized in the country in which it is located, has successfully completed the prescribed course of studies in midwifery and has acquired the requisite qualifications to be registered and/or legally licensed to practise midwifery. (11).

**Miscarriage**
The accidental loss of a fetus before a full term pregnancy, resulting in the death of the fetus. (11)

N

**Neonatal mortality rate (NMR)**

\[
NMR = \frac{\text{Deaths at 0–27 days after live birth} \times 1000}{\text{Live births}}
\]

*Source: (13)*
Neonatal period
The neonatal period commences at birth and ends 28 completed days after birth. Neonatal deaths (deaths among live births during the first 28 completed days of life) may be subdivided into early neonatal deaths, occurring during the first 7 days of life, and late neonatal deaths, occurring after the 7th day but before 28 completed days of life. (9,10)

Age at death during the first day of life (day zero) should be recorded in units of completed minutes or hours of life. For the second (day 1), third (day 2) and through 27 completed days of life, age at death should be recorded in days.

Neonatal seizures
Clinically defined as paroxysmal alterations in neurological function, i.e. behavioural, motor and/or autonomic function. (18)

No prenatal visit
No documented prenatal visit. (4)

P

Perinatal mortality rate
Subdivided into antenatal deaths + deaths in partu + deaths at 0–6 days after live birth × 1000/all births. (4)

Infant postneonatal mortality rate (IPMR)

\[
\text{IPMR} = \frac{\text{Deaths from 28 days to 1 year after live birth} \times 1000}{\text{Live births}}
\]

Source: (13)

Perinatal period
The perinatal period commences at 22 completed weeks (154 days) of gestation (the time when birth weight is normally 500 g), and ends 7 completed days after birth. (9,10)

Pregnancy-related death
Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death. (9,10)

Preterm infants
Less than 37 completed weeks (less than 259 days of gestation). (7)

R

Reproductive health
Within the framework of WHO’s definition of health as a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity, reproductive health addresses the reproductive processes, functions and system at all stages of life.

Reproductive health implies that people are able to have responsible, satisfying and safe sex lives and that they have the capability to reproduce and the freedom to decide if, when and how often to do so. Implicit in this are the right of men and women to be informed of and to have access to safe, effective, affordable and acceptable methods of fertility regulation of their choice, and the right of access to appropriate health care services that will enable women to go safely through pregnancy and childbirth and provide couples with the best chance of having a healthy infant. (2, 19) (NB The
Definitions and Indicators

**Safe motherhood**
Safe motherhood aims at attaining the best health of mothers and newborns. It implies the reduction of maternal mortality and morbidity and enhancement of the health of newborn infants through equitable access to primary health care, including family planning, prenatal, delivery and postnatal care for the mother and infant, and access to essential obstetric and neonatal care. (1, 2)

**Sexual health**
While recognizing that it is difficult to arrive at a universally acceptable definition of the totality of human sexuality, the following definition of sexual health is presented as a step in this direction: Sexual health is the integration of the somatic, emotional, intellectual and social aspects of the sexual being in ways that are positively enriching and that enhance personality, communication and love. ...Thus the notion of sexual health implies a positive approach to human sexuality, and the purposes of sexual health care should be the enhancement of life and personal relationships and not merely the counselling and care related to procreation or sexually transmitted diseases. (20, N.B. This quote starting on line 4 above, without quotation marks or attribution to WHO, is included as the definition of sexual health in the ICPD document para 7.1.)

**Sexuality**
Human sexuality is a natural part of human development through every phase of life and includes physical, psychological and social components. Sexual health implies a positive approach to human sexuality and is therefore an essential component of reproductive health. It includes the integration of the somatic, emotional, intellectual and social aspects of an individual in ways which positively enrich and enhance personality, communication, love and human relationships.

**Stillbirth**
Birth of a baby showing no signs of life. For international comparisons of perinatal mortality rates only such stillborn infants with a birth weight of 1000 g or more are included (from 1989 it is recommended that the lower weight limit should be 500 g). Sometimes stillborn babies are not weighed. In these cases a gestational age of 28 completed weeks or a body length of 35 cm can be taken as equivalent to 1000 g birth weight.

**Stillbirth rate**

\[
\frac{\text{Stillbirths} \times 1000}{\text{Live births + stillbirths}}
\]

Source: (13)

**Term**
From 37 completed weeks to less than 42 completed weeks (259–293 days) of gestation.

*Term (pre-).* Less than 37 completed weeks (less than 259 days) of gestation.

*Term (post-).* 42 completed weeks or more (294 days or more) of gestation. (7)
Unattended deliveries
Deliveries unattended by a midwife or doctor as a percentage of all deliveries. (4)

Under five mortality rate
Annual number of deaths of children under 5 years of age per 1000 live births. More specifically, this is the probability of dying between birth and exactly five years of age. (12)

REFERENCES


SELF TEST:
ESSENTIAL ANTENATAL, PERINATAL AND POSTPARTUM CARE

Module 1. Changing Maternity Care and Safe Motherhood

Which statements are accurate?

- Maternity care in most countries of the world is currently at a very high standard.
- Interventions practised routinely in pregnancy and childbirth care have been shown to be beneficial for the past 30 or more years.
- Pregnancy should be cared for only by obstetricians who have the highest training to cope with the many complications which occur.
- Pregnancy is a normal experience and not a time of illness.
- Much that has been done in the name of medical safety for mothers and babies has, at best, not been proved to be effective and, at worst, suspected to be harmful.

List the priorities for perinatal care in Europe as recommended by the WHO:

1.
2.
3.
4.
5.
6.
7.
8.
9.

Module 2. Providing most appropriate reproductive health care

Prioritize recommendations listed below according to grade of evidence.

Recommendation based on:
1. prospective cohort study
2. historical control
3. WHO expert Committee consensus
4. randomized control trial
5. meta-analysis of several RCT
6. case-control study

Define sensitivity of a test.

Define specificity of a test.
Cardiotocography (CTG) when used routinely increases the incidence of Caesarean section without changing perinatal outcome because of:
- The low sensitivity of the test
- The low specificity of the test

**Module 3. Antenatal care**

What is the most appropriate test to use for fetal surveillance in pregnancy?
- Woman’s weight gain
- Measurement of uterine fundus
- Auscultation of fetal heart rate
- Ultrasound before 16 weeks gestational age

What is the ideal number of antenatal visits for normal pregnancy care?
- Every month
- Every two weeks
- 4–5 times during pregnancy
- 12–14 times during pregnancy

Who can provide care during normal pregnancy?
- Obstetrician
- Neonatologist
- General practitioner/family doctor
- Midwife

**Module 4. Risk in Pregnancy**

In a pregnancy with a previous Caesarean section, when is the woman or the baby at high risk?
- During pregnancy
- During labour
- During the postpartum period
- The risk is for the woman
- The risk is for the fetus
- The risk is for the newborn

What are the four questions we should ask for evaluating our activities in perinatal care?
- What am I doing?
- Why am I doing this?
- Do I achieve my aim by doing this?
- Are there other appropriate activities which will achieve this aim?

**Module 5. Infections in pregnancy. Prevention of mother-to-child transmission of HIV**

Which of the infections listed below do not affect pregnancy?
- Chlamydia
- Bacterial vaginosis
- Vaginal candidiasis
- Syphilis
- Trichomonas
Proven strategies to reduce or prevent MTCT of HIV are:
- Antiretroviral therapy
- Elective Caesarean section
- Breastfeeding on demand
- Replacement feeding for the infant
- An option of termination of pregnancy where safe and legal services exist
- Induction of labour before 34 weeks

Module 6. Parent education

List the objectives of education for parents:

Module 7. Anaemia in Pregnancy

What critical level of haemoglobin is considered on evidence-based information to be a poor prognostic factor for perinatal outcome?
- <110g/l
- <100g/l
- <90g/l
- <70g/l

What measures should be taken to improve the anaemia status of women?
- Prescribe folates always
- Prescribe iron for all women in pregnancy
- Prescribe iron only when needed
- Avoid tea with meals
- Tea with lemon at meals is acceptable
- Vitamin C when needed (with iron)

Module 8. Referral and Bleeding in Pregnancy

What should you do if presented with a woman who is 9 weeks pregnant, spotting from the vagina and with back pain?
- Hospitalize her
- Use progesterone and HCG
- Use ultrasound if available at admission
- Reassure and support the woman
- Bedrest at home
What should you do if presented with a woman who is 32 weeks pregnant with moderate bleeding from the vagina?
- Bedrest at home
- Hospitalization
- Tocolysis and referral
- Ultrasound

**Module 9. Hypertension**

What criterion is used to diagnose severe pre-eclampsia?
- Diastolic BP of >110mmHg
- Systolic BP of >110mmHg plus proteinuria of 300mg or 1+
- Diastolic BP of >90mmHg
- Systolic BP >140mmHg plus proteinuria of 300mg or 2+
- BP as in 1, but no proteinuria
- BP as in 2, but no proteinuria

What are the aims of medical treatment of pre-eclampsia?
- Increase or substitute placental circulation (improve placental function)
- Improve fetal wellbeing
- Prevent eclampsia
- Prevent rupture of blood vessels (stroke)
- Prevent liver damage

Which laboratory tests indicate bad prognosis in cases of Pregnancy Induced Hypertension?
- Hb<100g/l
- Platelets < 100 000/l
- AST > 50 iu/l
- Urine protein > 500mg/l

**Module 10. First stage of labour**

How often should you do vaginal examinations during the first stage of labour?
- Every 30 minutes
- Every 2 hours
- Every 4–8 hours

How often should you perform auscultation the fetal heart?
- Every 4–8 hours
- Every 2 hours
- Every 30–60 minutes

What should we do on admission of the women to hospital?
- Shave her
- Give her an enema
- Give her a shower
- Read the antenatal record
What kind of diet can a woman have in labour?
- No food or drinks
- Only drinks
- Only meals
- Drinks and liquid meals

What position will you advise a woman to take in first stage labour?
- Standing
- Sitting upright
- On hands and knees
- Lying down on her back
- Any position in which she is comfortable

**Module 11. The Partogram**

Crossing of the action line indicates that:
- We must immediately finish the delivery
- We must actively examine the situation to decide whether we can continue until spontaneous delivery or should we interfere
- We must perform Caesarean section

When should the partograph be started?
- When regular contractions appear
- On admittance to delivery ward with regular contractions
- After rupture of amniotic membranes

**Module 12. Becoming high risk in labour and oxytocin**

Oxytocin is used for:
- Induction of labour
- Augmentation of labour
- Prevention of postpartum haemorrhage

Contraindications of using oxytocin in labour?
- Severe haemorrhage
- Hypertension
- Cephalopelvic disproportion

**Module 13. Obstructed labour**

The minimal acceptable progress of the cervical opening in the active phase of labour is?
- 2cm/h
- 1cm/h
- 0.5 cm/h

What are the optimal intervals for vaginal examination in labour?
- every 2 hours
- Every 4 hours
• Every 8 hours
• Every hour

What is the first choice of treatment for prolonged latent phase of labour?
• Oxytocin
• Sedation and rest
• ARM
• C/S

**Module 14. Second stage of labour**

What position would you advise the woman to take for the second stage of delivery?
• Side lying
• Squatting
• Supported squatting
• The dangle
• Lying on her back with her legs in stirrups

When should you ask the woman to push in the second stage of labour?
• At full dilation of the cervix
• At “0” station of the presenting part of the fetus
• When the presenting part of the fetus reaches the outlet of the pelvis
• The woman should push in response to her own feelings

**Module 15. Third stage of labour**

When should we examine the cervix for tears?
• Routinely after the delivery of the placenta
• Routinely after induced or stimulated labour
• Never
• In the case of abnormal bleeding from the vagina

At what moment should we clamp the umbilical cord?
• Immediately after delivery
• After 1–2 minutes or when the cord stops pulsating
• After the delivery of the placenta

**Module 16. Induction of labour**

What are the effective means of induction?
• Oxytocin
• Prostaglandins
• Estrogens and calcium
• ARM

Define post-term pregnancy:
• After 40 completed weeks of pregnancy
• After 41 completed weeks of pregnancy
- After 42 completed weeks of pregnancy

What conditions are essential for induction in the sake of post-term pregnancy?
- Accurate estimation of gestational age
- Consent from the mother
- Written local protocol for the induction procedure

**Module 17. Postpartum Haemorrhage**

What are the reasons for postpartum haemorrhage?
- Weakness of uterine muscles
- Intrauterine infection
- Multiparity
- Late first antenatal visit
- Multiple pregnancy

What measures should we take to stop postpartum bleeding?
- Place cold (ice) on uterine projection
- Empty urine from the bladder
- Oxytocin I/V or i/m
- Manual compression of uterus

**Module 18. Care of the Newborn and Resuscitation**

What delivery room temperature is best for the newborn?
- 17–15 degrees and lower
- 20–24 degrees
- 25 degrees and higher

What principles of newborn care are desirable?
- Separation of newborn and mothers
- An atraumatic delivery
- Clean delivery
- Thermal protection of the newborn
- Immediate breastfeeding after delivery
- Initiation of breathing
- Eye care as soon as the baby is born
- Immunization
- Management of illness
- Care of preterm and low-birth-weight newborns

What should the midwife do to resuscitate the newborn?
- Clean the respiratory tract with hand suction pump
- Use the mask and Ambu bag
- Intubation
- Washing the respiratory tract with liquids after intubation
Module 19. Care of Mother and baby in first week after delivery

What must the midwife do for mother and baby in the first week after delivery?
- Check the uterus
- Check bleeding
- Check blood pressure
- Check breastfeeding and positioning
- Routine disinfection of stitches
- Routine disinfection of umbilical cord

Module 20. Infant feeding

List the 10 steps for successful breastfeeding
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

What is the Code of Marketing of Breast-milk Substitutes?

Module 21. Family Planning

Which is the best method of contraception?
- Oral contraceptives
- IUD
- Condoms
- Whichever suits the woman’s sexual behavior best

Family planning should:
- Be offered immediately after delivery
- Include breastfeeding as a good form of contraception
- Be offered to the woman at her six weeks check-up only
- Always include the father/partner

Module 22. Postnatal check-up

What must the midwife do for the mother at her postnatal check-up?
- Check the perineum
- Check the cervix routinely
- Check the woman’s heart rate with a cardiograph
- Check blood pressure
- Check the uterus
Module 23. Record keeping

Home based maternity care records are:
- Not useful as mothers lose them
- Not as comprehensive as is needed
- Lost less often than hospital records
- More complete than hospital based records

Module 24. Protocols

Which statements are correct?
- Local protocols are more acceptable than those obtained from a higher level.
- Protocols should be made by senior obstetricians and gynaecologists staff of the hospital.
- Protocols should be made, discussed and accepted by working groups which include obstetricians, midwives, neonatologist, anaesthetist, psychologist and mother’s representatives.
- Protocols should be based on evidence-based interventions.

Module 25. Audit

What are the aims of audit?
- To determine who was responsible for the poor outcome
- To explore the opinions of health care users concerning the quality and acceptability of services
- To determine how to improve quality of care or to prevent recurrence of complications

Module 26. Synoptic tables of interventions

Synoptic tables are based on meta-analyses of:
- Comparative studies
- Controlled studies
- Randomized control studies
- Believed traditions

Module 27. Strategies to implement local appropriate interventions

List some of the essential philosophies of care underlying any reform programme for perinatal care:
Module 1. Safe Motherhood and Changing Maternity care

- Pregnancy is a normal experience and not a time of illness.
- Much that has been done in the name of medical safety for mothers and babies has, at best, not been proved to be effective and, at worst, suspected to be harmful.

- Care should be demedicalized.
- Care should use appropriate technology.
- Care should be regionalized.
- Care should be evidence-based.
- Care should be multidisciplinary.
- Care should be holistic.
- Care should be family-centred.
- Care should be culturally appropriate.
- Care should involve women in decision-making.

Module 2. Providing most appropriate reproductive health care

Prioritize the level of evidences according to grade of confidence.

Recommendation based on:
1. meta-analysis of several RCT
2. randomised control trial
3. prospective cohort study
4. case-control study
5. WHO expert Committee consensus

Sensitivity and Specificity:
- Sensitivity is the ability of a test to include all the cases it is designed to detect.
- Specificity is the ability of a test to exclude all the cases that are negative.

CTG:
- Low specificity of the test

Module 3. Antenatal care

- Measurement of uterine fundus
- 4–5 times during pregnancy
- Obstetrician, midwife or family doctor

Module 4. Risk in pregnancy

- During labour
- The risk is for the woman
- The risk is for the fetus
- What am I doing?
- Why am I doing this?
- Do I achieve my aim by doing this?
- Are there other appropriate activities which will achieve this aim?

**Module 5. Infection in pregnancy. Mother-to-child HIV transmission**

- Vaginal candidiasis
- Trichomonas

Proven strategies to reduce or prevent MTCT of HIV are:
- antiretroviral therapy
- elective Caesarean section
- replacement feeding for the infant
- an option of termination of pregnancy where safe and legal services exist

**Module 6. Parent education**

- To give confidence to couples
- To help women/couples have a happy experience
- To prepare the couple for labour and delivery
- To encourage a healthy lifestyle
- To encourage breastfeeding
- To help a couple adjust to parenthood
- To provide support
- To provide information for parents for pregnancy, birth and parenthood

**Module 7. Anaemia**

- <70g/l
  - Prescribe folates always
  - Prescribe iron only when needed
  - Avoid tea with meals
  - Vitamin C when needed (with iron)

**Module 8. Referral and Bleeding during pregnancy**

- Use ultrasound if available at admission
  - Reassure and support the woman
  - Bedrest at home

- Hospitalization
  - Tocolysis and referral
  - Ultrasound
Module 9. Hypertension

- Diastolic BP of >110mmHg
  Systolic BP of >110mmHg plus proteinuria of 300mg or 1+

- Prevent eclampsia
  Prevent rupture of blood vessels (stroke)

- Platelets < 100 000/l
  AST > 50 iu/l

Module 10. First stage of labour

- Every 4–8 hours
- Every 30–60 minutes
- Read the antenatal record
- Drinks and liquid meals
- Standing
  Sitting upright
  On hands and knees
  Any position she chooses for herself

Module 11. The Partogram

- We must actively examine the situation to decide whether we can continue until spontaneous delivery or should we interfere.

- On admittance to delivery ward with regular contractions

Module 12. Becoming high risk in labour and oxytocin

- Induction of labour
  Augmentation of labour
  Prevention of postpartum haemorrhage

- Acute haemorrhage
  Cephalopelvic disproportion

Module 13. Obstructed labour

- 0.5cm/h
- every 4 hours
- sedation and rest
Module 14. Second stage of labour

- Side lying
- Squatting
- Supported squatting
- The dangle
- The woman should push in response to her feelings

Module 15. Third stage of labour

- In the case of abnormal bleeding from the vagina
- After 1–2 minutes or when the cord stops pulsating

Module 16. Induction of labour

- Oxytocin
- Prostaglandins
- ARM
- After 42 completed weeks of pregnancy
- Accurate estimation of gestational age
- Consent from the mother
- Written local protocol for the induction procedure

Module 17. Postpartum Haemorrhage

- Weakness of uterine muscles
- Intrauterine infection
- Multiparity
- Multiple pregnancy
- Empty urine from the bladder
- Oxytocin I/V or i/m
- Manual compression of uterus

Module 18. Care of the Newborn and Resuscitation

- 25 degrees and higher
- An atraumatic delivery
- Clean delivery
- Thermal protection of the newborn
- Initiation of breathing
- Immunization
- Management of illness
- Care of preterm and low-birth-weight newborns
• Clean the respiratory tract with hand suction pump
  Use the mask and Ambu bag

Module 19. Care of mother and baby in the first week

• Check bleeding
  Check blood pressure
  Check breastfeeding and positioning

Module 20. Infant feeding

• 1. Have a written breastfeeding policy that is routinely communicated to all health staff.
  2. Train all health care staff in the skills necessary to implement this policy.
  3. Inform all pregnant women about the benefits of breastfeeding.
  4. Help mothers to initiate breastfeeding within half an hour after birth.
  5. Show mothers how to breastfeed and how to maintain lactation even if they should be separated from their babies.
  6. Give newborn infant no food or drink other than breast-milk, unless medically indicated.
  7. Practise rooming-in – allow mothers and infants to remain together 24 hours a day.
  8. Encourage breastfeeding on demand.
  9. Do not give artificial teats or pacifiers (also called dummies or soothes) to breastfed infants.
  10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital.

• An internationally agreed code which prohibits the free distribution and advertising of breast-milk substitutes to mothers

Module 21. Family Planning

• Whichever suits the woman’s sexual behavior best

• Be offered immediately after delivery
  • Include breastfeeding as a good form of contraception

Module 22. Postnatal check-up

• Check the perineum
  • Check blood pressure

Module 23. Record keeping

• Lost less often than hospital records
  • More complete than hospital based records
Module 24. Protocols

- Local protocols are more acceptable than those obtained from a higher level.
- Protocols should be made, discussed and accepted by working groups which include obstetricians, midwives, neonatologist, anaesthetist, psychologist and mother’s representatives.
- Protocols should be based on evidence-based interventions.

Module 25. Audit

- To explore the opinions of health care users concerning the quality and acceptability of services.
  To determine how to improve quality of care or to prevent recurrence of complications.

Module 26. Synoptic tables of interventions

- Randomized control studies

Module 27. Strategies to implement local appropriate interventions

List some of the essential philosophies of care underlying any reform programme for perinatal care:

- Care should be demedicalized
- Care should be family-centred
- Care should be based on evidence-based practice
Making Pregnancy Safer

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