

# Education material for teachers of midwifery

Midwifery education modules - second edition

## Managing puerperal sepsis



**World Health  
Organization**

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WHO Library Cataloguing-in-Publication Data

World Health Organization.

Education material for teachers of midwifery : midwifery education modules. – 2<sup>nd</sup> ed.

6 modules in 1 v.

Contents: Foundation module : the midwife in the community -- Managing eclampsia -- Managing incomplete abortion -- Managing prolonged and obstructed labour -- Managing postpartum haemorrhage -- Managing puerperal sepsis.

1. Midwifery – education. 2. Pregnancy complications – therapy. 3. Teaching materials. I. Title II. Title: Midwifery education modules.

ISBN 978 92 4 154666 9

(NLM classification: WQ 160)

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Printed in France

## ACKNOWLEDGEMENTS

The midwifery modules have been developed by the World Health Organization (WHO) because of the need for education materials to facilitate the teaching of the midwifery skills required to respond to the major causes of maternal death.

Ms Gaynor Maclean developed the initial draft of the modules and pretested some of the teaching–learning methods in two African countries. Ms Friederike Wittgenstein prepared the field-testing version of the modules, retaining most of the ideas and methods included in the initial draft. Ms Judith O’Heir developed the field-testing protocol, coordinated the field-testing activities in five countries in Africa, Asia and the Pacific, and completed the modules following field-testing. Ms Barbara Kwast, and later Sister Anne Thompson, both midwives of international repute, were responsible as WHO staff members for the nurturing, development, production and ultimately, the dissemination and use of the modules.

WHO gratefully acknowledges the contribution of many individuals and institutions in particular, the International Confederation of Midwives (ICM) and the American College of Nurse-Midwives (ACNM), who were involved in the development, pretesting, refining, field-testing and completion of the modules. Deep appreciation is expressed to individuals in the field-testing countries for the time and effort they devoted to using the field-testing version, and to their invaluable comments for the final version.

This second edition of the midwifery modules has been developed under the auspices of the Making Pregnancy Safer team, with valuable contributions from other colleagues within the Department of Reproductive Health and Research. Layout of the modules was done by Ms Maureen Dunphy and overall administration was carried out by Ms Shamilah Akram. This second edition is being published jointly by WHO and ICM, who would like to thank Ms Betty Sweet and Ms Judith O’Heir for the revision and updating of the modules, all the members of the Strengthening Midwifery Technical Meeting held in Geneva 2001 for their valuable comments, contributions and helpful suggestions for further improvements in finalizing the second edition and IPAS for their comments and assistance with the preparation of the new module on Management of incomplete abortion and post-abortion care, and for kind permission to use their illustrations.

Finally, WHO gratefully acknowledges the financial contributions made in support of this and related activities within the Maternal Health and Safe Motherhood Programme, and later the Making Pregnancy Safer initiative, from the governments of Australia, Italy, Norway, Sweden and Switzerland, the Carnegie Corporation, the Rockefeller Foundation, UNDP, UNICEF, UNFPA, and the World Bank. Financial support for the production of the first edition of the modules was provided by the Carnegie Corporation, the governments of Italy and Japan, and the Swedish International Development Cooperation Authority.



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# INTRODUCTION

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## INTRODUCTION

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Every year it is estimated that worldwide, more than 500 000 women die of complications of pregnancy and childbirth. At least 7 million women who survive childbirth suffer serious health problems and a further 50 million women suffer adverse health consequences after childbirth. The overwhelming majority of these deaths and complications occur in developing countries.

To support the upgrading of midwifery skills so that countries can respond to this situation by strengthening maternal and newborn health services, a set of midwifery training modules was developed by the World Health Organization (WHO). The need for the modules was identified by the midwives and teachers of midwives from around the world who attended the Pre-Congress Workshop on Midwifery Education: Action for Safe Motherhood, held in Kobe, Japan in 1990 under the joint sponsorship of WHO, the International Confederation of Midwives (ICM) and the United Nations Children's Fund (UNICEF). The framework for midwifery education developed at the workshop formed the basis for the modules.

The modules, while primarily intended for in-service training programmes for midwives and nurse-midwives, can also be used in basic and post-basic midwifery programmes. In addition, the modules can be used to update the midwifery skills of other health care professionals. It is important to note, however, that they are not meant to replace midwifery textbooks which deal with other aspects of care during pregnancy, childbirth and the postnatal period, but are instead intended to serve as the basis for teaching midwives and midwife trainees, or others requiring these specific midwifery skills, to respond appropriately to major causes of maternal mortality such as haemorrhage, abortion complications, obstructed labour, puerperal sepsis and eclampsia. The modules can also be used for updating the knowledge and skills of midwifery teachers.

The modules aim to help midwives and others develop into skilled practitioners who are able to think critically and make clinical decisions on the basis of sound knowledge and understanding of these complications. Nonetheless, it is assumed that midwives and midwife trainees who undertake training using the modules, will already have gained proficiency in most of the basic skills such as measuring blood pressure, performing a vaginal examination, conducting a normal delivery and prevention of infection. Therefore, when using the modules for basic midwifery programmes, these skills should be taught first.

A variety of other skills are included in the modules because they are considered essential to comprehensive midwifery practice. In some countries some of these skills may not be a part of midwifery practice and, indeed, may be seen as the responsibility of the medical practitioner rather than of the midwife. However, the modules have been developed based on the belief that, in addition to basic midwifery skills, midwives require a range of life saving skills to enable them to make a significant contribution to reducing maternal deaths and to promoting safe motherhood.

In the original series released in 1996, there were five modules. More recently, a further module on managing incomplete abortion was added. The modules were updated in 2001–2002, in line with recent evidence and the WHO guideline for *Managing complications in pregnancy and childbirth: a guide for midwives and doctors*. The foundation module deals with the midwife in the community, while the technical modules each cover specific problems which may lead to maternal death. It is estimated that the foundation module will

require a minimum of two weeks for effective teaching and learning, while each technical module will require from ten days to two weeks. These time frames may vary depending on factors such as the ability of students and the resources available to support the teaching–learning process and the schedule of the teaching–learning programme.

Each of the modules is self-contained and can, if necessary, be taught independently of the other modules. They are, however, intended to complement each other, since together they present a comprehensive approach to dealing with the major causes of maternal mortality and morbidity. It is therefore advisable to use the modules in a way that will enable midwives to work through all of them.

All of the skills covered in the modules are necessary if midwives are to be effective in giving prompt and appropriate care to women who experience complications of pregnancy and childbirth, and to comply with the international definition of skilled attendant<sup>1</sup> for pregnancy, childbirth and postnatal care. Nevertheless, it may be that in some countries midwives are not legally authorized to perform all of the required skills. In these countries the modules will need to be adapted to conform to local regulations relating to midwifery practice, while at the same time, efforts should be made to introduce legislative changes to ensure that midwives are allowed to perform these required skills.

## STRUCTURE OF THE MODULES

All the modules have the same structure, with the exception of the foundation module which follows a slightly different pattern from the others. The foundation module does not deal with a specific clinical problem, but with the general issue of maternal mortality, the factors which contribute to it, and the importance of working with the community to help make motherhood safer. The sessions in this module are therefore structured around these topics.

The technical modules deal with specific clinical problems and follow a common framework; each begins with an introduction to the specific problem which is then followed by sessions on the related avoidable factors, identifying the problem, managing the problem, and learning the required clinical skills.

The sessions in all of the modules are presented in the following way:

Introduction and outline to the session which describes:

**Aims** – aim of the specific session

**Objectives** – what the student will be able to do upon completion of each session

**Plan** – outline plan for the session

**Resources** – student instructions and worksheet, puzzles and textbooks

<sup>1</sup> A skilled attendant is a health professional with midwifery skills, such as midwives, and those doctors and nurses who have been educated and trained to proficiency in the skills to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period and to identify, manage or refer complications in the woman and newborn. (*Making pregnancy safer: the critical role of the skilled attendant. A joint statement by WHO, ICM and FIGO.* Geneva, World Health Organization, 2004).

*Instructions for the teacher* (text in italics): explain step-by-step how to lead the session, and sometimes includes suggested methods for assessment of learning.

**Supplementary material for the teacher** (normal text): gives details of the teaching content for both theory and practice.

**Instructions for students** (labelled as “Instructions for Students”, or “Instructions for Group Work”): provide guidelines for individual or group activities.

## **CONTENT OF THE MODULES**

### **The midwife in the community**

The module begins with the Story of Mrs X which shows how certain social, economic and cultural factors, combined with delays in seeking and obtaining medical care put mothers at risk of complications which frequently lead to death. The theme from the story is then reinforced throughout the remainder of the module. Special emphasis is given to the role of midwives in promoting safe motherhood in the community by helping individuals, families and other community members understand and contribute to safe motherhood.

There are sessions covering specific topics such as the place and value of women in society; advancing safe motherhood through human rights; traditional beliefs, practices and taboos affecting the health of women during pregnancy and childbirth; the recognition and reduction of risk factors; the concept of delay as it relates to maternal death; and HIV/AIDS and safe motherhood. Additional sessions include the use of community profiling for planning community-based care and for evaluation of that care.

### **Managing postpartum haemorrhage**

In order that students may fully understand how postpartum haemorrhage occurs, this module begins with a detailed explanation of the physiology and management of the third stage of labour. Students then learn what postpartum haemorrhage is, how it occurs, what factors contribute to it, how it can be identified, and the critical points for management.

The skills specific to preventing and managing postpartum haemorrhage include: identification of the factors which place women at risk for postpartum haemorrhage; management of the third stage of labour; massaging the uterus and expelling clots; applying bimanual compression to the uterus; applying manual compression to the aorta; suturing perineal tears; suturing an episiotomy; repair of cervical and high vaginal tears; and manual removal of the placenta. The general skills in this module include: urinary catheterization; taking and recording observations; taking blood samples for analysis; setting up and monitoring intravenous infusions; monitoring blood transfusion; universal precautions for prevention of infection, and maintaining records. Some of these general skills are also included in the other technical modules.

### **Managing prolonged and obstructed labour**

This module begins with a review of the anatomy and physiology relevant to the management of prolonged and obstructed labour. On the basis of this, the module explains what makes obstructed labour more likely to occur, what

happens in obstructed labour, how signs of obstructed labour can be identified, and steps to be taken for effective management. Special emphasis is placed on the use of the partograph in monitoring labour.

The skills specific to preventing and managing prolonged and obstructed labour include: identification of risk factors; assessing pelvic outlet; diagnosing presentation and position of the baby; assessing descent of the fetal head; recognizing obstructed labour; and vacuum extraction. The general skills in this module include: urinary catheterization; taking blood samples for analysis; setting up and monitoring an intravenous infusion; administering necessary drugs; maintaining fluid balance; universal cautions for prevention of infection; and maintaining records.

### **Managing puerperal sepsis**

This module begins with an explanation of the problem of puerperal sepsis. The content then covers the factors which contribute to the infection, how it can be identified and differentiated from other conditions, how it can be prevented and, if it does occur, how it can be managed. A session on HIV and AIDS, related to childbearing women, is also included.

The skills specific to preventing and managing puerperal sepsis include: identification of risk factors; identification of symptoms and signs; taking a midstream specimen of urine; taking a high vaginal swab; and maintaining vulval hygiene. The general skills in this module include: taking and recording observations; taking blood samples for analysis; setting up and monitoring an intravenous infusion; maintaining fluid balance; universal precautions for prevention of infection; administering necessary drugs; preventing thromboembolic disorder; and maintaining records.

### **Managing eclampsia**

This module begins with an explanation of the conditions pre-eclampsia and eclampsia. The content then covers the factors which contribute to eclampsia, how it can be identified and differentiated from other conditions, how it can be prevented and, if it does occur, how it can be managed.

The skills specific to preventing and managing eclampsia include: identification of risk factors for pre-eclampsia and eclampsia; midwifery observations; and care and observation during a fit. The general skills in this module include: taking blood samples for analysis; setting up and monitoring an intravenous infusion; administering necessary drugs; urinary catheterization; preventing thromboembolic disorder; universal precautions for prevention of infection; and maintaining records.

### **Managing incomplete abortion**

This module begins with an explanation of abortion, including the types of abortion, the effect of abortion on maternal mortality and morbidity, the prevention of unwanted pregnancy, laws and regulations related to abortion, sociocultural and religious perspectives, and the role of midwives in abortion care, with particular emphasis on emergency abortion care. The content then covers the factors which contribute to abortion, how it can be identified and differentiated from other conditions, how it can be prevented and, if it does occur, how it can be managed.

The skills specific to managing incomplete abortion include: manual vacuum aspiration, and post-abortion family planning counselling and methods. The following skills, which are also in the postpartum haemorrhage module, are included because they may be necessary when managing incomplete abortion: applying bimanual compression to the uterus; applying manual compression to the aorta; and repair of cervical and high vaginal tears. The general skills in this module include: taking and recording observations; taking blood samples for analysis; setting up and monitoring intravenous infusions; monitoring blood transfusions; administering drugs, urinary catheterization; preventing thromboembolic disorder; universal precautions for prevention of infection; and maintaining records.

## **TEACHING–LEARNING METHODS**

The modules propose a range of teaching–learning methods designed to maximize student involvement in the teaching–learning process, based on principles of adult learning. There is an emphasis in the modules of applying theory to practice, thus adequate time in the clinical areas and visits to the community are an essential part of the teaching–learning process, and careful attention and advanced preparation is required for this component, as it is for the theory content.

### **Modified lectures**

Modified lectures are used in the modules to introduce new information and to review content that students may already be familiar with. They include strategies such as brainstorming, buzz groups, question and answer sessions and discussion which involve students in their own learning. The modules include a variety of visual materials for the teacher to use in order to make their sessions as interesting as possible.

The teacher may wish to augment the lecture content included in the modules with information from other sources, or simply follow the outline provided. In either case it will be important to prepare in advance for each session by reading the relevant content and reference materials, and by ensuring that resources for students are available if required.

### **Discussions**

It is important to allow time for discussion at appropriate points during, or at the conclusion of, teaching sessions. This will provide an opportunity for students to ask questions about information that is unclear to them, as well as to make contributions on the basis of their knowledge and experience, and for the teacher to assess the views and level of knowledge and understanding of the students.

### **Group work and feedback**

Many of the sessions in the modules involve group work, which is usually followed by a feedback session from each group to the whole class. The groups should be kept as small as possible (preferably not more than six students per group), the aim being to provide an opportunity for students to examine a specific issue or problem. It is important to ensure that there is sufficient space for the groups to meet without disturbing each other. Each group will need a facilitator who will be responsible for keeping the discussion going and ensure

that the group completes its work. Where the facilitator is someone other than the teacher, this person should be supplied with briefing notes. In addition, it is essential the teacher rotates through each group without disrupting the discussion, to ensure the group are keeping to their brief, or to assist with any difficult questions or issues that may arise. In addition, each group will require a rapporteur who will take notes and provide feedback to the class as a whole. Specific instructions are provided in the sessions which involve group work.

### **Tutorials**

A tutorial is an informal teaching–learning session between a teacher and a student or a small group of students. Tutorials are time-consuming but are essential for discussing students’ progress. Tutorials usually follow a specific learning activity and give students an opportunity to express their concerns to the teacher and, in turn, give the teacher an opportunity to get to know each student better, particularly in relation to the progress being made. Tutorials are included in each of the modules, but not in all sessions.

### **Practical exercises**

Practical exercises provide an opportunity for students to demonstrate their knowledge and skill related to a particular topic. It is important in these situations to provide clear instructions to the students about the exercises to be undertaken and to monitor their progress and provide help when required. The foundation, postpartum haemorrhage, management of prolonged and obstructed labour, and management of incomplete abortion modules include practical exercises.



### **Community visits**

Community visits are intended to be both instructive and enjoyable experiences for the students. The foundation module includes a series of community visits aimed at helping students understand how the concepts in this module apply in the community. Community visits must, however, be planned and organized well in advance, including the choice of an appropriate community, seeking authorization from the relevant authorities to visit the community, and contacting a key person who is able to facilitate and supervise the student activities in the community. Another important consideration is the availability of transport to take students to and from the community.

The teacher may choose to organize the community visits so that they are implemented on consecutive days, rather than at the intervals suggested. If this change is made, it will be important to ensure that it does not interfere with the achievement of the learning objectives for the module.

### **Clinical teaching**

Clinical teaching is extremely important in the technical modules because the clinical skills students learn can mean the difference between life and death for the women in their care. The underlying theory for each of the skills in the modules should be taught in the classroom and, where possible, the skills themselves taught in a simulated clinical setting prior to taking the students to the real clinical area. Facilities where clinical practice is to take place should be chosen on the basis of the anticipated availability of women with conditions included in the modules. However, even with the best of planning, it will not always be possible to guarantee hands-on experience for every

student for the full range of skills. It will be important, therefore, to consider other opportunities for students to learn the necessary skills, for instance by simulation and local mechanism to gain appropriate clinical experience following completion of the course.

Arrangements with the staff at the health facilities where clinical teaching is to take place must be made in advance. Moreover, the students' visits to these facilities for the purpose of clinical practice should not disturb routine client care. When students are learning and practising hands-on skills, supportive supervision must be provided by the teacher or by other trained and experienced staff until competency in the relevant skills has been achieved.

### **Drama and role play**

Drama and role play may be used to emphasize points made by the teacher. In both cases students are asked to act out a real or imaginary situation. In drama, students make up their own characters and to some extent their own story in order to illustrate a particular point. In role play, students take the part of specific individuals such as the midwife, the village leader, the distressed relative or the worried mother. This provides students with an opportunity to view and understand situations, issues and/or problems from the perspective of others. Drama and role play are included as optional activities in several of the modules.

### **Case studies**

The technical modules provide students with the opportunity to present case studies as the basis for evaluating the effectiveness of care in specific situations. Students will be able to learn from their own experience as well as from that of others. The intention of case studies is not to criticize the practice of others; instead, students should be encouraged to look at past practice and see what lessons can be learned for the future. The case studies should be based on client records selected to demonstrate the management of particular conditions (e.g. eclampsia). It should be noted that client confidentiality must be maintained throughout the presentation of case studies.



### **Learning games and puzzles**

Learning games and puzzles provide interactive and enjoyable means for students to gain new knowledge, and to review and consolidate existing knowledge. The learning games and puzzles in the modules will be new to the teachers who use them, and it is therefore important that they become familiar with them in advance. In particular, it is important that the teacher be able to provide a clear explanation to students as to the use of the games and puzzles to be used, and to monitor progress during the activity.

### **Workshops**

A workshop is a period of planned activity on a specific topic, often with a presentation by one or more guest speakers. Where workshops are recommended the content and programme are suggested. Workshops require careful planning with regard to the content, timetable, and facilities. The puerperal sepsis and eclampsia modules include workshops in the session on care plans.



## **Reflection**

Learning occurs as a result of reflecting on experience. Students should therefore be encouraged to reflect on their experience in clinical practice and record their reflections in a diary or notebook. These reflections can be used as a basis for discussion with tutorial staff and/or peers. A framework for reflection includes selecting an experience, identifying their own feelings and thoughts about that experience, feelings and thoughts of others, and then evaluating what was good and what was bad about the experience. Next, the student is encouraged to try to make sense of the experience by analysing why it was good and/or bad, and determine what else could have been done in the situation to improve the outcome. Finally, an action plan is made for future practice when a similar situation arises. Discussing the experiences recorded in their reflective diaries either in groups or with a teacher helps to give students different perspectives on their experience. A summary of such discussions should be added to the recordings in the diary to help with recall at a later date.

## **ASSESSMENT OF STUDENTS**

### **Pre- and post-tests**

Pre-tests provide a useful means of establishing a baseline for students' theoretical knowledge. The same questions used in the pre-test should be used again in the post-test to assess knowledge on completion of the module. The teacher may also wish to add additional questions to the post-test. It should be noted that during the teaching-learning process, other options for assessment (see below) should be used, in particular to determine the progress being made by each student as the course continues. Examples of pre- and post-test questions are included in each of the technical modules.

### **Assessing clinical competence**

The assessment of clinical competence constitutes the major component of student assessment in the technical modules. Throughout the sessions which involve the teaching of clinical skills in the modules, there are sections entitled Assessing Competence. These sections provide guidelines for teachers to assess the clinical competence of students, following the teaching of a specific clinical skill. Where possible, the teacher should observe the performance of skills in a clinical setting. However, this may not always be possible, because clients with the particular conditions included in the modules may not always be available at the appropriate time. In these circumstances teachers should attempt to provide simulated situations which offer the opportunity for students to practice and be assessed in the relevant skills. Trained staff in the clinical areas may also be involved in the assessment of the students' clinical competence.

### **Other options for assessment**

Other options for assessment will be available during group work, such as tutorials, student seminars, learning games and quizzes, and during community visits. These activities provide vital opportunities for the teacher to monitor the progress of students in terms of achieving the learning objectives of particular sessions in the modules.

## PLANNING FOLLOW-UP ACTIVITIES

Comprehensive midwifery practice relies on experience, as well as knowledge and skills. Experience is what the students will gain as they put into practice what they have learned from these modules, when they return to their respective places of work.

It is precisely when they begin to put their knowledge and skills into practice that the midwives will come across situations that may raise questions for them. For example, there may be issues and problems which they would like to discuss with supervisors and more experienced practitioners, in order to seek solutions and improve practice. This may be particularly applicable for midwives and nurse-midwives who, at the end of the training course, still require additional hands-on clinical experience in some of the skills included in the modules.

Therefore, a follow-up meeting, perhaps six months after the end of the course, will be important to enable the students to share experiences, report on successes, review progress, and discuss problems related to practice. Other follow-up meetings may also be appropriate, perhaps after one year, and even again after two years.

## SUMMARY OF MODULE

Session	Teaching–Learning methods	Time frame (approximate)
1. UNDERSTANDING PUERPERAL SEPSIS	Lecture, discussion Community visit	1 hour ½ day
2. AVOIDABLE FACTORS	Modified lecture Group work Feedback, discussion	½ hour 1 hour 1½ hours
3. IDENTIFYING THE PROBLEM	Modified lecture Group work, feedback, discussion  Clinical teaching	½ hour 2 hours  1 hour per small group of students
4. MANAGING PUERPERAL SEPSIS	Lecture, discussion	2 hours
5. LEARNING CLINICAL SKILLS	Lecture  Clinical teaching	2 hours  Approximately 2 hours per small group of students per skill, and additional time for individual practice and assessment
6. CASE STUDIES	Case studies, discussion, group work, feedback  Optional tutorials	3 hours  1 hour per student or small group of students

## GETTING STARTED

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Before beginning Session 1, you may wish to recall how the sessions are presented.

**Aims** – aim of the specific session

**Objectives** – what the student will be able to do upon completion of each session

**Plan** – outline plan for the session

**Resources** – student instructions and worksheet, puzzles and text books

**Instructions for the teacher** (text in italics): explain how to lead the session, step-step, and sometimes include suggested methods for assessment.

**Supplementary material for the teacher** (normal text): gives details of the teaching content for both theory and practice.

**Instructions for students** (labelled as “Instructions for Students” or “Instructions for Group Work”): provide guidelines for individual or group activities.

### **Other important points to consider before you begin:**

- The time-frame indicated in the plan at the beginning of each session in the module may be changed by the teacher, as required. Depending on the knowledge and abilities of students, and on their learning needs, the time required for an activity may be longer or shorter than the time specified in the plan. It is estimated that this module will require between 10 days and 2 weeks to teach.
- Ensure that any Notes for Students you wish to use are prepared in advance and are made available to your class at the beginning of the module/session.
- If you have prepared pre- and post-tests, you should refer to the appendix at the end of the module, before beginning the first session in the module.
- Remember that this module, like the other technical modules, is not meant to replace midwifery textbooks. It may, therefore, be helpful to have at least one such textbook available for reference as you progress through this and the other sessions in the module.



# 1

## UNDERSTANDING PUERPERAL SEPSIS

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# SESSION 1

## UNDERSTANDING PUERPERAL SEPSIS

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### Aims

- To enable students to understand how puerperal sepsis occurs and the dangers of this condition.
- To enable students to understand the importance of prompt diagnosis and management in order to save lives.

### Objectives

On completion of Session 1, students will be able to:

- Define puerperal sepsis and give examples of the different bacteria which may be involved.
- Explain the difference between endogenous and exogenous bacteria.
- Explain how endogenous bacteria can become harmful, and how exogenous bacteria can be introduced into the vagina.
- Explain how puerperal sepsis occurs.
- Explain why newly delivered women are very vulnerable to puerperal sepsis.
- List possible causes of fever in the puerperium which are not directly associated with childbirth.
- Investigate the extent of puerperal sepsis in the community.

### Plan

Lecture, discussion (1 hour).

Community visit and hospital/health facility visit to examine records (½ day).

### Resources

*Managing complications in pregnancy and childbirth: a guide for midwives and doctors.*  
Geneva, World Health Organization, 2003 (WHO/RHR/00.7).

## INTRODUCTION

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*Explain that puerperal sepsis is one of the major causes of maternal death and accounts for 15 per cent of all maternal deaths in developing countries. If it does not cause death, puerperal sepsis can cause long-term health problems such as chronic pelvic inflammatory disease (PID) and infertility.*

*It is extremely important for midwives to be able to prevent puerperal sepsis and treat it promptly.*

*The first part of this session involves teaching about puerperal sepsis and how it occurs. Then, arrange a community visit to investigate the extent of puerperal sepsis in the community.*

## DEFINING PUERPERAL SEPSIS (METRITIS)

Puerperal sepsis is any bacterial infection of the genital tract which occurs after the birth of a baby. It is usually more than 24 hours after delivery before the symptoms and signs appear. If, however, the woman has had prolonged rupture of membranes or a prolonged labour without prophylactic antibiotics, then the disease may become evident earlier.

### **Bacteria which cause puerperal sepsis**

Some of the most common bacteria are:

- streptococci
- staphylococci
- escherichia coli (E.coli)
- clostridium tetani
- clostridium welchii
- chlamydia
- gonococci (bacteria which cause sexually transmitted diseases).

More than one type of bacteria may be involved when a woman develops puerperal sepsis.

Bacteria may be either endogenous or exogenous.

### **Endogenous bacteria**

These are bacteria which normally live in the vagina and rectum without causing harm (e.g. some types of streptococci and staphylococci, E.coli, clostridium welchii).

Even when a clean technique is used for delivery, infection can still occur from endogenous bacteria.



Endogenous bacteria can become harmful and cause infection if:

- they are carried into the uterus, usually from the vagina, by the examining finger or by instruments during pelvic examinations
- there is tissue damage, i.e. bruised, lacerated or dead tissue (e.g. after a traumatic delivery or following obstructed labour)
- there is prolonged rupture of membranes because microorganisms can then enter the uterus.

## Exogenous bacteria

These are bacteria which are introduced into the vagina from the outside (streptococci, staphylococci, clostridium tetani, etc.).

Exogenous bacteria can be introduced into the vagina:

- by unclean hands and unsterile instruments
- by droplet infection (e.g. a health provider sneezing, coughing onto own hands immediately prior to examination)
- by foreign substances that are inserted into the vagina (e.g. herbs, oil, cloth)
- by sexual activity.

Students should be aware of the problem of postpartum tetanus and sexually transmitted diseases which are both caused by exogenous bacteria.

***Postpartum tetanus*** is infection of the mother or baby caused by clostridium tetani. Tetanus bacilli, which grow in the intestines of animals and humans, are particularly prevalent in rural areas. They are found in soil and dust and are spread by animal and human faeces. The organisms enter the body through a laceration or break in the skin. In the case of puerperal sepsis, they may enter via lacerations of the genital tract or through the unhealed placental site. In some countries, it is the practice to place herbs or other substances that may be infected into the vagina during or after labour, in the mistaken belief that it will be helpful. In babies, the point of entry is often the umbilical cord, especially if it is cut with a dirty instrument, or in some cultures, herbs or cow dung are used to dress the cord.

***Tetanus*** is an acute and often fatal disease, but it can be prevented by immunization. All women in pregnancy should have their immunization status checked and be given a course of tetanus toxoid, if not fully immunized. The schedule for immunization is as follows:

First contact with women of childbearing age:	Tetanus toxoid 1 (TT1)
At least 4 weeks after TT1:	Tetanus toxoid 2 (TT2)
At least 6 months after TT2:	Tetanus toxoid 3 (TT3)
At least 1 year after TT3:	Tetanus toxoid 4 (TT4)
At least 1 year after TT4:	Tetanus toxoid 5 (TT5)

In areas where *sexually transmitted infections* (STIs) (e.g. gonorrhoea and chlamydial infection) are common, they cause many uterine infections. If a woman develops a STI during pregnancy and it remains untreated, the microorganisms causing the disease will stay in the genital tract and may cause a uterine infection after delivery. Uterine infections caused by STIs can be prevented by diagnosis of the condition and implementing the appropriate treatment during pregnancy.

### Symptoms and signs of puerperal sepsis

The following symptoms and signs occur in puerperal sepsis:

- fever (temperature of 38°C or more)
- chills and general malaise
- lower abdominal pain
- tender uterus
- subinvolution of the uterus
- purulent, foul-smelling lochia.

Symptoms and signs that may also be present:

- light vaginal bleeding
- shock.

### Risk factors for puerperal sepsis

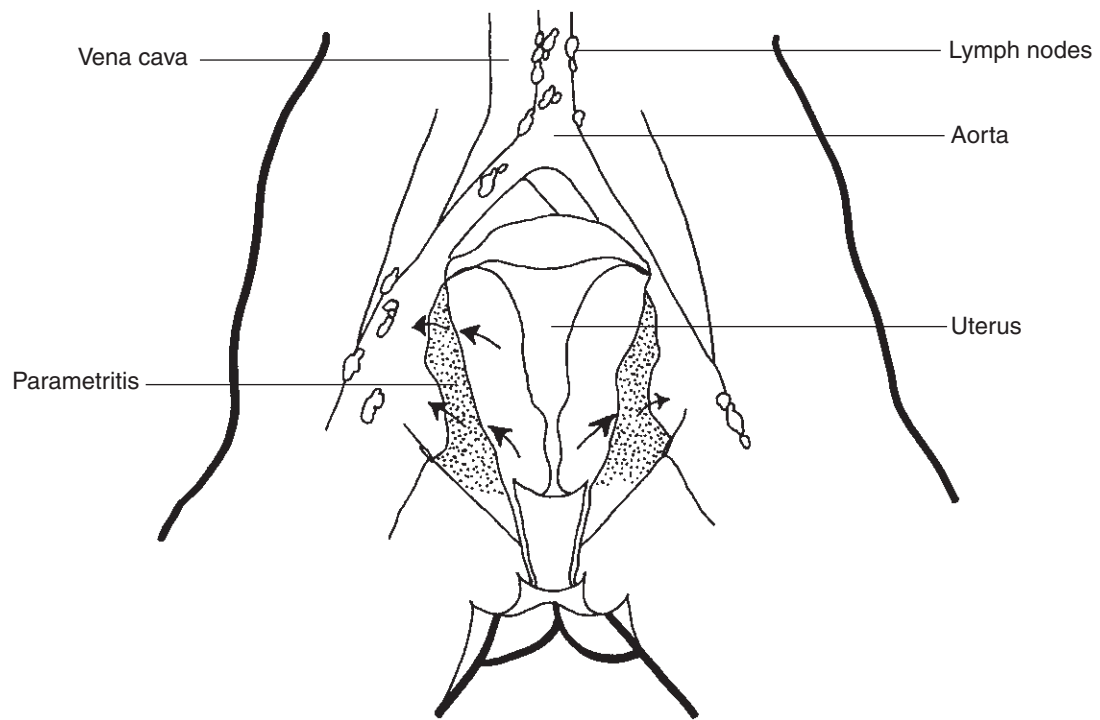
Some women are more vulnerable to puerperal sepsis, including for example those who are anaemic and/or malnourished. For example, protracted labour, prolonged rupture of the membranes, frequent vaginal examinations, a traumatic delivery, caesarean section and retained placental fragments all predispose to puerperal infection. Session 2 looks at risk factors and how they may be prevented.

## HOW PUERPERAL SEPSIS OCCURS

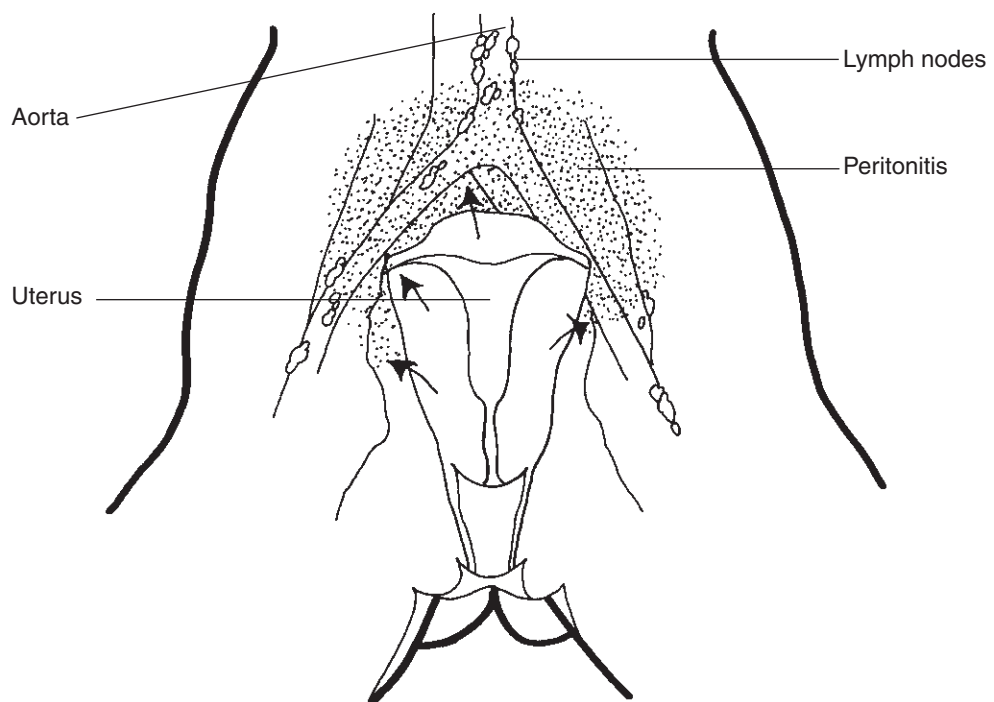
The uterine infection may start before the onset of labour i.e. in cases of pre-labour rupture of the membranes, during labour, or in the early postnatal period before healing of lacerations in the genital tract and the placental site have taken place.

In cases of pre-labour rupture of membranes, antibiotics should be given either to treat amnionitis, if the woman has fever and foul-smelling vaginal discharge, or as a prophylactic measure to reduce the risk of infection.

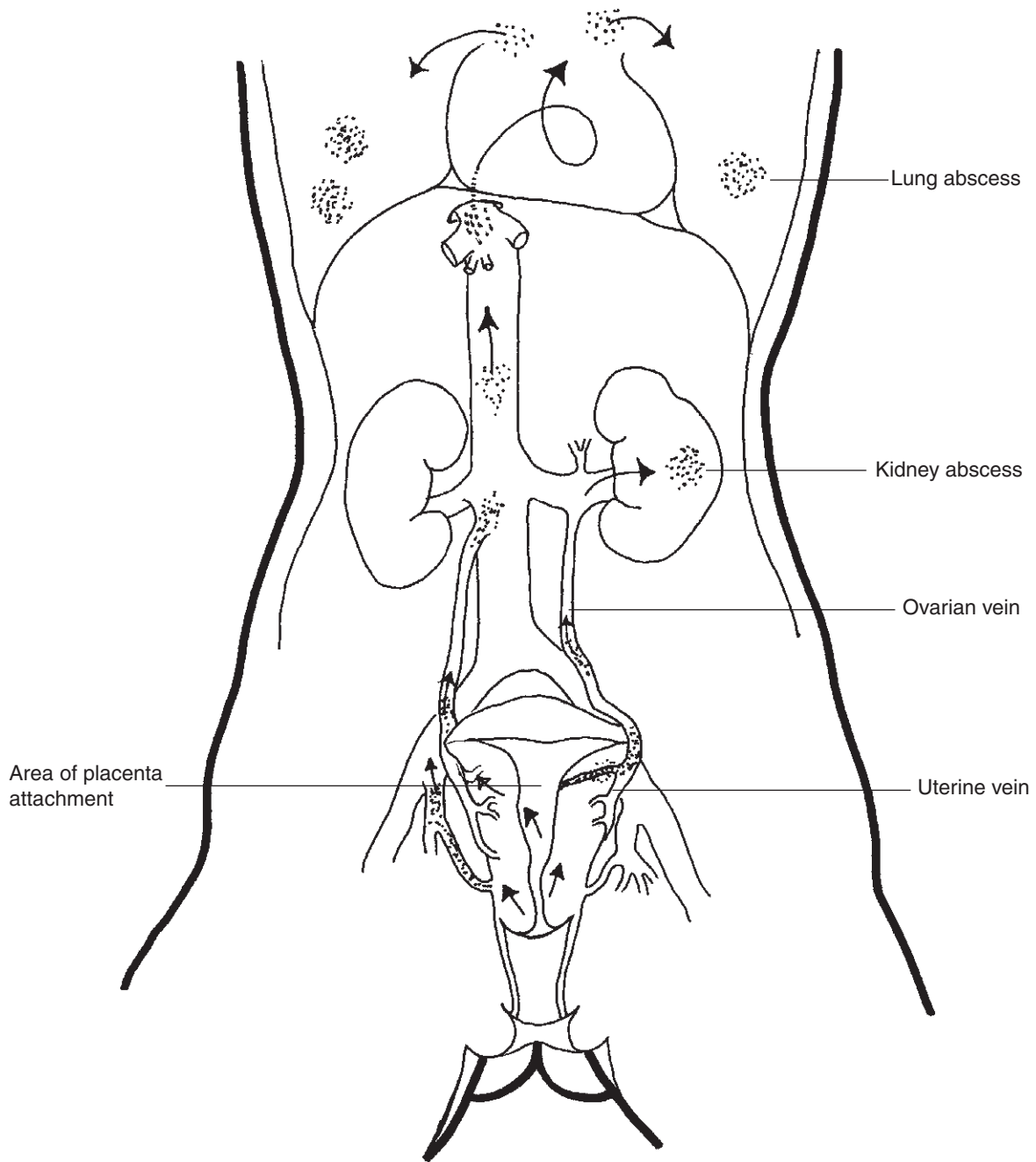
Following delivery, puerperal sepsis may be localized in the perineum, vagina, cervix or uterus. Infection of the uterus can spread rapidly if due to virulent organisms, or if the mother's resistance is impaired. It can extend beyond the uterus to involve the fallopian tubes and ovaries, to the pelvic cellular tissue causing **parametritis** (Figure 1.1) to the pelvic peritoneum, causing **peritonitis** (Figure 1.2), and into the blood stream causing **septicaemia** (Figure 1.3).



**Figure 1.1** Infection spreading through uterine wall causing **parametritis**



**Figure 1.2** Infection spreading through uterine wall and lymphatics causing **peritonitis**



**Figure 1.3** Infection spreading through the venous circulation leading to **septicaemia**

Thrombophlebitis of the uterine veins can transport infected clots to other organs. Severe infection can be further complicated by septic shock and coagulation failure which gives rise to bleeding problems. Puerperal sepsis can be rapidly fatal.

*Explain and check the students' understanding of the figures, e.g. imagine that the abdominal wall is transparent and one can see through it to the vessels and organs.*

Women are particularly vulnerable to infection in the postpartum period because of the following factors:

1. The placental site is large, warm, dark and moist. This allows bacteria to grow very quickly. It is an ideal medium to culture bacteria. In the laboratory, warm, dark and moist conditions are produced artificially in order to help bacteria grow and multiply.
2. The placental site has a rich blood supply, with large blood vessels leading directly into the main venous circulation. This allows bacteria in the placental site to move very quickly into the bloodstream (**Figure 1.3**). This is called septicaemia. Septicaemia can lead to death very quickly.
3. The placental site is accessible via the genital tract to both endogenous and exogenous microorganisms. Only the vagina (7–10 cm long) separates the entrance to the uterus from the vulva and perineum. Therefore, high standards of vulval and perineal cleanliness during labour and after delivery are essential to prevent harmful bacteria (e.g. *E.coli* from the rectum) from entering the uterus and causing metritis.
4. During the actual birth, women may have sustained tears in the cervix, vagina or perineal area or have had an episiotomy. These areas of traumatized tissue are susceptible to infection, especially if the aseptic technique during vaginal examinations and at delivery was poor, and the situation is exacerbated by poor standards of perineal and vulval cleanliness in the early postnatal period. Infection is usually localized initially, but can spread to underlying and surrounding tissues and into the bloodstream, causing septicaemia.

## OTHER CAUSES OF FEVER IN THE POSTPARTUM PERIOD

Fever in the puerperium can also be caused by:

- urinary tract infection (acute pyelonephritis)
- wound infection (e.g. scar of caesarean section)
- mastitis or breast abscess
- thrombo-embolic disorders, e.g. thrombophlebitis or deep vein thrombosis
- respiratory tract infections (pneumonia)
- other medical conditions, such as malaria and typhoid
- human immune deficiency virus (HIV)-related infections.

Session 3 looks at how to recognize the different causes of fever in the puerperium.

## SUMMARY AND DISCUSSION

*Ask the students if there are any questions.*

*Ask the students: Have you ever seen a woman with puerperal sepsis?*

*(Students may have seen this condition in their midwifery practice, especially if they are experienced midwives. They may know friends, relatives or neighbours who have suffered from puerperal sepsis). If they have seen or known someone with puerperal sepsis, ask them about the presentation of the disease and the outcome.*

*Emphasize that if women are discharged early, hospital staff may not be aware of the extent of the problem!*

*For this reason the students must go out into the community to investigate the incidence of puerperal sepsis. Inform them when this will be, and when they will get more information about this visit.*

*Summarize the session.*

## COMMUNITY VISIT

### Before the visit

*Ensure all arrangements, including transport, are carried out well in advance.*

*When arranging the visit, give the students clear written instructions about what to do during and after the visit.*

## During the visit

*They should meet with the following people:*

- *families*
- *older women, mothers-in-law*
- *community leaders*
- *other health workers in the community*
- *traditional birth attendants (TBAs)*
- *traditional doctors, healers.*

*They should ask the following questions.*

- *Has any woman had a fever after having a baby (or abortion) in the past year?*
- *If so, what happened to her?*
- *Did she recover?*
- *How long did it take for her to recover?*
- *Does she have any problems now? (There may be ongoing problems caused by the infection, e.g. blockage of the fallopian tubes resulting in infertility; pelvic inflammatory disease).*
- *Did she have treatment?*
- *What treatment did she have?*
- *Who gave her the treatment?*
- *If the woman died, how long after the birth did it happen?*

*Emphasize to the students that they should ask the questions with sensitivity. This is especially important if the woman died.*

*Students should record their observations in a notebook or diary.*

*You may also choose to ask some students to look at local health facility records from the past year for evidence of women treated for puerperal sepsis. They should examine admission registers, and other available records in:*

- *maternity wards*
- *gynaecology wards*
- *local health facilities, if not included in the above.*

## After the visit

*Arrange a feedback session. All the students should share the answers they obtained.*

*Summarize by asking if puerperal sepsis is a problem in this area.*

*Puerperal sepsis can be prevented, which is the subject of the next session.*

# 2

## AVOIDABLE FACTORS

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## SESSION 2

# AVOIDABLE FACTORS

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### Aims

- To enable students to recognize the factors which contribute to maternal deaths due to puerperal sepsis, and to understand that these deaths are preventable.

### Objectives

On completion of Session 2, students will be able to:

- Define avoidable factor, risk factor, direct obstetric death, and indirect obstetric death.
- List the risk factors for puerperal sepsis and identify those that are avoidable.
- Describe the steps to be taken in order to prevent death from the factors identified as avoidable.

### Plan

Modified lecture, discussion (½ hour).

Group work (1 hour).

Feedback and discussion (1½ hours).

### Resources

Instructions for Students.

Worksheet.

## INTRODUCTION

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*If you have already introduced students to the definitions of avoidable factors, risk factors, direct obstetric death, and indirect obstetric death in one of the other technical modules, you should review the definitions now and proceed with the remainder of the sessions.*

## DEFINITIONS

*Ensure that students understand the following definitions.*

### **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.

*It is important that students understand the following:*

“Risk factors” should not be used to predict complications. The system of risk categorization, or the “risk approach”, previously used for selecting women for specialized management is not useful, because evidence shows that many women categorized as “high risk” do not actually experience a complication, while many women categorized as “low risk” do. All pregnant women should therefore be considered “at risk” of developing a complication.

### **Direct obstetric death:**

is a death resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium), from interventions, omissions of care, incorrect management, or from a chain of events resulting from any of the above.

### **Indirect obstetric death:**

is a death resulting from previous existing disease or 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.

*Ask for examples of avoidable factors and discuss them, confirming that they are avoidable. For instance:*

- *prolonged rupture of membranes should be identified early, and the woman treated with antibiotics if the membranes have been ruptured for 18 hours or more. If there are symptoms and signs of infection, or the period of gestation is less than 37 weeks, she should be referred to a higher level health facility. Failure to provide the appropriate standard of care if the membranes were ruptured for 18 hours or more, or not referring to a higher level health facility, would be considered an avoidable factor.*

*In order to prevent maternal death, it is necessary to look not only at cause of death, but also the risk factors:*

- *prolonged rupture of membranes is a risk factor because infection is more likely to occur.*

## **GROUP WORK**

*Divide the students into groups and give them the Instructions for Group Work and Worksheet, which can be found at the end of this session. Explain what they have to do by working through the instructions provided.*

## **Feedback**

*After the group work, facilitate feedback by allowing each group to report back in detail. Use the checklist provided as a guide to the factors which should be mentioned.*

*Identify the avoidable factors and discuss the steps taken to avoid them, as suggested by the group. Help the students to understand that puerperal sepsis is avoidable and must be prevented.*

*Discuss the role of the midwife in educating pregnant women and their families, TBAs and community leaders about the symptoms of puerperal sepsis; the importance of clean hands and instruments during the birth; and the necessity of referring a woman with prolonged rupture of membranes to a health facility, or to a higher level of care.*

*Stress the importance of immunizing pregnant women against tetanus, and of diagnosing and treating sexually transmitted infections during prenatal care.*

*Discuss the role of traditional practices such as the insertion of herbs, cow dung or mud into the vagina in causing puerperal sepsis and especially tetanus, and how the midwife can influence these practices.*

*Help students to realize that the inaccessibility of health facilities, the lack of transportation, community distrust of health care personnel and the low status of women, all contribute to delays in referring women with puerperal sepsis and will increase their chances of dying from the condition. Explain that the low status of women makes them more likely to suffer from anaemia and malnutrition, conditions that increase the danger of death from puerperal sepsis.*

*Help students to realize that once a woman with puerperal sepsis reaches a health facility, she may die unless she receives prompt treatment. Staff need to be adequately trained in recognizing and treating puerperal sepsis and have the necessary resources to enable them to give effective care, e.g. appropriate antibiotics.*

*Finally, discuss strategies to improve maternal care at all levels of the health care system. This would include meetings to compile an inventory of supplies and drugs needed to prevent and treat puerperal sepsis and other complications, and a list of essential skills required by health staff and people working at community level to improve maternal care.*

*After the discussion, ask if there are any questions.*

*Summarize, emphasizing the importance of prevention.*

## CHECKLIST FOR PUERPERAL SEPSIS ✓

The most common site of infection in puerperal sepsis is the placental site. Other sites of infection are abdominal and perineal wounds following surgery and lacerations of the genital tract, e.g. cervix, vagina and perineum.

### Risk factors for puerperal sepsis

These include

- poor standards of hygiene
- poor aseptic technique
- manipulations high in the birth canal
- presence of dead tissue in the birth canal (due to prolonged retention of dead fetus, retained fragments of placenta or membranes, shedding of dead tissue from vaginal wall following obstructed labour)
- insertion of unclean hand or non-sterile instrument, packing into the birth canal (traditional practices should also be examined)
- pre-existing anaemia and malnutrition
- prolonged/obstructed labour
- prolonged rupture of membranes
- frequent vaginal examinations
- caesarean section and other operative deliveries
- unrepaired cervical lacerations, or large vaginal lacerations
- pre-existing sexually transmitted infections
- postpartum haemorrhage
- inadequate, or no immunization with tetanus toxoid
- diabetes.

Other factors that affect the incidence of puerperal sepsis include community and health service factors. If services and resources in health facilities are inadequate, they increase the danger of women dying from puerperal sepsis.

### Community risk factors

These include:

- lack of transportation and resources needed for taking the woman to a referral facility which can adequately manage such complications
- great distance from a woman's home to a health facility
- low socioeconomic status; inability to pay for treatment
- poor level of general education
- cultural factors which lead to delay in seeking medical care
- low status of women
- lack of knowledge about symptoms and signs of puerperal sepsis
- lack of health education, danger signs of infection or lack of birth and emergency preparation plan.

## Health service risk factors

These include:

- inaccessibility of appropriate health facilities
- inadequate toilet and washing facilities
- poor standards of cleanliness in the health facility
- unacceptable delays in providing care at health facility
- lack of necessary resources, e.g. staff, equipment, drugs (most effective antibiotics)
- poor basic training of staff and inadequate continuing education
- inadequate standards of care in labour and in the early postnatal period
- failure to recognise the onset of infection
- inadequate and/or delayed bacteriological investigations
- inadequate response to signs of infection, including inappropriate use of antibiotics
- shortage of safe blood for transfusion.

## INSTRUCTIONS FOR GROUP WORK

**(Please read all the instructions carefully before you begin)**

1. Define puerperal sepsis.
2. List the sites of infection in puerperal sepsis.
3. List the risk factors for puerperal sepsis. (Risk factors are factors which make the chance of puerperal sepsis more likely or more dangerous).
4. Explain why each factor makes infection more likely.
5. Mark those risk factors which are avoidable (or can be prevented).
6. Outline the steps which must be taken to prevent these avoidable factors at each level of the health care system (community, health centre, district hospital).

You are given an example below. Using the following Worksheet, work through it in the same way for the other risk factors for infection of the placental site, and for the other sites of infection.

You have **one** hour in your group.

If required, use additional paper.

Appoint a group leader and a person to report back.

### Example:

Sites of infection	Risk factors	Why does this factor make infection more likely	Avoidable?	Steps to avoid occurrence
Infection of placental site	Prolonged rupture of membranes	Because bacteria can go up from the vagina into the uterus	Yes	<p>Community: Refer to next level of care if ruptured more than 18 hours and not in labour.</p> <p>Health Centre: Refer to next level of care if ruptured more than 18 hours and not in labour, and give antibiotics.</p> <p>District Hospital: Augment labour with oxytocin when obstructed labour is excluded. Provide antibiotic cover.</p>

PREVENTING PUERPERAL SEPSIS				
Sites of infection	Risk factors	Why does this factor make infection more likely	Avoidable?	Steps to avoid occurrence





# 3

## IDENTIFYING THE PROBLEM

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## SESSION 3

### IDENTIFYING THE PROBLEM

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#### Aims

- To enable students to understand the importance of identifying and defining the problem of infection in the puerperium in order to provide effective management.
- To enable students to acquire the art of diagnosis and differential diagnosis when infection occurs during the puerperium.

#### Objectives

On completion of Session 3, students will be able to:

- List the steps involved in providing effective management.
- List the causes of fever in the puerperium.
- Describe the clinical picture of a woman with puerperal sepsis.
- Describe the clinical picture of the conditions associated with childbirth which may adversely affect a woman during the puerperium.
- Describe the clinical picture of the conditions not associated with childbirth which may have to be distinguished from complications of the puerperium.
- Demonstrate how to make a diagnosis and a differential diagnosis of puerperal sepsis.
- Outline the details which should be noted when taking a history from a woman with one of the above conditions.
- List the tests and investigations which may be used to confirm diagnosis of these conditions.

#### Plan

Modified lecture (½ hour).

Group work, feedback, discussion (2 hours).

Clinical teaching (1 hour per small group of students).

#### Resources

*Managing complications in pregnancy and childbirth: a guide for midwives and doctors.*

Geneva, World Health Organization, 2003 (WHO/RHR/00.7).

Puzzle (ensure sufficient for the number of students in the group).

## INTRODUCTION

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*Introduce this session by explaining that there are **six** steps to giving effective management.*

*The six steps are:*

- 1. Identify the problem.*
- 2. Decide on the aim of management (depending on level of care, i.e. stabilize and refer for high level care, or give prompt effective treatment).*
- 3. Select the best management.*
- 4. Provide management, determining priorities.*
- 5. Evaluate the outcome.*
- 6. Provide further management if necessary. This may include referral.*

*This session is about step 1. Identifying the problem involves making an accurate diagnosis. This in turn often includes making a differential diagnosis (i.e. deciding which of two or more conditions may be the cause of the symptoms and signs noted).*

*It may be helpful to think of making a diagnosis as a kind of “detective work”.*

*Ask students to form small discussion groups to decide how this is done.*

*Suitable questions to ask could be:*

- how does a detective make a decision about a crime?*
- what does a detective do?*

*Answers should include that a detective:*

- looks for clues*
- makes careful observation*
- uses all the senses (sight, hearing, smell, touch)*
- asks questions*
- takes all circumstances into account.*

*Relate this to discussion about diagnostic skills.*

*Remind students that, in a similar way to a detective, we have to solve problems. The decisions we make are very important.*

*The following guidelines may help.*

*Students must use all their senses and powers of observation to:*

- *look*
- *listen*
- *touch*
- *think carefully*
- *ask the question: What is the problem?*
- *consider all available information.*

*A detective does not come to a conclusion from one clue but takes them all into consideration. Students must learn to do the same.*

*Ask students to form discussion groups.*

*Ask them to suggest what conditions associated with childbirth may cause fever in the puerperium. Next, ask them to say which conditions, not directly associated with childbirth, may cause fever in the puerperium.*

## **CAUSES OF FEVER IN THE PUERPERIUM**

### **Causes of fever associated with childbirth**

#### **Infectious causes**

1. Puerperal sepsis, depending on how far it has spread, may present as:
  - localized infection of a wound (caesarean section scar), laceration or episiotomy
  - infection of laceration or episiotomy which has spread to the underlying soft tissue
  - metritis
  - salpingitis
  - parametritis
  - generalized peritonitis
  - septic thrombophlebitis
  - tubo-ovarian abscess
  - broad ligament abscess
  - abscess in Pouch of Douglas
  - abscesses in other sites in the abdomen or chest
  - septicaemia (an infection that has entered the bloodstream and is a very serious condition)
  - septic shock may complicate septicaemia.

2. Breast infection such as mastitis or, at a later stage, breast abscess.
3. Urinary tract infection (UTI).
4. Chest infection (pneumonia).
5. Thromboembolic disorders, including superficial thrombophlebitis and deep vein thrombosis, may give rise to fever and tachycardia.

### Non-infectious causes

Low-grade temperature elevations are very common in the early postpartum period, particularly in the first 24 hours. Causes of such fevers include dehydration, tissue trauma and breast engorgement. Although fever occurring in the first 24 hours after delivery has generally been regarded as unrelated to infection, a temperature of 38°C or higher within the first 24 hours, should alert the midwife to the possibility of puerperal sepsis.

### Causes of fever not associated with childbirth

Any infection may occur during the puerperium. There is a list of examples below. Make sure that any infections which are prevalent in your area are included. Acquired immune deficiency syndrome (AIDS) and HIV infections, are not considered in detail in this module, although infection prevention will be dealt with in the next session. Also see Session 10 in the Foundation module.

Examples:

- Chest infections (such as pneumonia, bronchitis, pulmonary tuberculosis)
- Malaria
- Typhoid
- Dysentery
- Hepatitis
- Meningitis
- Acquired immune deficiency syndrome (AIDS) can also produce a variety of symptoms and make the woman more vulnerable to other infections.

## MAKING A DIAGNOSIS

*Explain that identifying the problem involves making an accurate diagnosis. This in turn often includes making a differential diagnosis (i.e. deciding which of two or more conditions may be the cause of the symptoms and signs noted). It may be helpful to think of making a diagnosis in the same way as building up a picture.*

### The clinical picture

*This exercise is designed to help students practise putting together pieces of information that will help them make a diagnosis. Divide the students into groups to work on the puzzles.*

*Give each group clinical picture (A) plus two other pictures. Clinical picture (A) is puerperal sepsis. The other pictures are:*

*(B) mastitis*

*(C) urinary tract infection (acute pyelonephritis)*

*(D) deep vein thrombosis*

*(E) pneumonia.*

*Cut the puzzle sheets into pieces along the lines indicated. Mix together two or three sets to give to each group. The students should not know the diagnosis before they work on the puzzle.*

*Provide the students with the Instructions for Group Work.*

*Checklists are also provided. These include history, tests and investigations for each clinical picture. Use these checklists to guide the discussion when taking feedback.*

*During the group work, check that students are able to put the pictures together and discover the correct diagnosis.*

## **Feedback**

*After the group work, ask each group to report on:*

- *the conditions they have diagnosed*
- *the facts they would expect to obtain on taking a history of the condition studied*
- *the tests/investigations which would help confirm diagnosis of the condition studied.*

## **The clinical examination**

*Discuss the typical findings of the clinical picture in the classroom, then go into the clinical area to demonstrate clinical examination. Make sure that students are able to do a complete postnatal examination (see Session 5). This is essential in making a diagnosis.*

*Demonstrate and assess students doing this examination on a healthy newly-delivered mother. This is because a woman with an infection will be feeling ill, and should not be disturbed unnecessarily.*

*Examination of women with puerperal sepsis will, of course, have to be undertaken when students have learned the basic skills of examination. It may be some time before all students have gained this experience. It is hoped there will not be too many women with puerperal sepsis. Meanwhile, ask students to share their experience of this condition in practice. Explain and discuss the history, signs, symptoms and any investigations which help to make a diagnosis.*

*Take the opportunity to teach about different conditions encountered during the clinical examinations. Use the clinical picture sheets and the checklists to remind you of the details.*

**Assessment of learning:  
class exercise**

*Use the following class exercise to check students' understanding.*

- 1. Give each group of students a piece of paper with the name of one of the clinical conditions A–E written on it. Make sure that puerperal sepsis is included, but only once.*
- 2. Ask each group in turn to present to the rest of the class the history, symptoms and signs of a woman with the condition indicated on their paper. Encourage students to write on the blackboard, flipchart or use an overhead projector. They may also choose to use drama to present a typical picture of the condition.*
- 3. Insist that the class wait until all the facts are presented and/or the drama is complete before they state the diagnosis.*
- 4. When each group has presented its case, summarize the main findings and check if there are any questions.*
- 5. Emphasize that when the clinical picture is not clear, a range of tests must be used to make a differential diagnosis, or to confirm the expected diagnosis.*

*On completion, check again if there are any questions. Summarize this part of the session, and then summarize the whole session by linking theory to practice.*

**Note**

*You may wish to add other common medical conditions prevalent in your area to the set of clinical pictures. Do this by adding the symptoms and signs on a blank sheet of paper. Make your own checklist for history and tests/investigations.*



## INSTRUCTIONS FOR GROUP WORK

### The Clinical Picture

1. You have been given many small pieces of card. Place them all on the table so that the black dot(s) on each piece faces upwards.
2. Separate the cards from each other so that you can easily read the symptoms and signs which are written on each one.
3. When the cards are fitted together correctly, they will form three complete clinical pictures. Each clinical picture has a drawing of a woman in the centre. Clinical symptoms and signs are written around the drawing. These may be experienced by a woman who becomes ill during the puerperium.
4. Choose the cards which you think best fit together to describe the symptoms and signs of a particular condition which may be accompanied by fever. Place the cards together to make a complete clinical picture.
5. When you have completed your three clinical pictures, read again the symptoms and signs and decide on the most likely diagnosis for the woman in each picture.
6. Write down your diagnosis for each clinical picture. One is marked A and you have two others: B, C, D, or E. Check your diagnosis by carefully turning the picture over, piece by piece, and reading the diagnosis written on the other side. The diagnosis can be seen only when all the cards are put together in the correct order.
7. For each of the three clinical pictures, discuss and write down:
  - the typical facts you may obtain on taking a history from this woman
  - wherever appropriate, the tests or investigations which would help to confirm the diagnosis.

# CHECKLIST ✓

## A. Puerperal sepsis (septicaemia)

### History

The following are common risk factors:

- poor standards of hygiene
- poor aseptic technique
- manipulations high in the birth canal
- presence of dead tissue in the birth canal (due to prolonged retention of dead fetus, retained fragments of placenta or membranes, shedding of dead tissue from vaginal wall following obstructed labour)
- insertion of unclean hand, instrument or packing into the birth canal (traditional practices should also be examined)
- pre-existing anaemia and malnutrition
- prolonged labour
- prolonged rupture of membranes
- frequent vaginal examinations
- caesarean section and other operative deliveries
- unrepaired cervical lacerations, and large vaginal tears
- pre-existing sexually transmitted diseases
- postpartum haemorrhage
- inadequate, or no immunization with tetanus toxoid
- diabetes.

### Symptoms and signs

- fever - temperature 38°C or more
- chills and general malaise
- lower abdominal pain
- tender uterus
- subinvolution
- purulent, foul-smelling lochia.

There may also be:

- light vaginal bleeding
- shock.

### Tests/investigations to confirm diagnosis

- midstream specimen of urine
- wound swab, e.g. perineal or abdominal, or high vaginal swab
- blood culture, in the presence of chills or evidence of severe infection.

### Important

Start broad spectrum antibiotics without delay, while awaiting laboratory results (see Session 5). Septicaemia can develop rapidly, and has a high mortality rate.

## CHECKLIST ✓

### B. Mastitis

#### History

The onset of the condition is rapid. The woman is usually breastfeeding.

There may have been:

- breast engorgement
- a cracked nipple which has allowed bacteria to enter through the broken skin
- difficulty in fixing the baby to the breast, leading to nipple damage
- bruising of the breast tissues due to rough handling.

The baby may have signs of skin or eye infections.

#### Symptoms and signs

- breast pain and tenderness
- reddened, wedge-shaped area visible on breast
- occurs typically 3–4 weeks after delivery, or later, but can begin earlier
- there may be inflammation preceded by engorgement
- usually only one breast is affected.

#### Tests/investigations to confirm diagnosis

A sample of breast milk should be sent for bacteriological examination, including culture and sensitivity.

#### Important

Start broad spectrum antibiotics without delay, while awaiting laboratory results.

Mastitis can lead to breast abscess. Any septic focus can lead to a spread of infection, with a real risk of septicaemia.

# CHECKLIST ✓

## C. Urinary tract infections

These are:

- cystitis (infection localized to the bladder)
- severe pyelonephritis (infection has spread to the kidneys).

## History

The following are common risk factors:

- a urinary tract infection present during pregnancy (the physiological changes in the urinary tract predispose to stasis of urine, and this predisposes to infection, therefore infection in pregnancy may re-occur after the birth)
- trauma during labour
- catheterization during labour
- poor vulval hygiene
- anaemia.

## Symptoms and signs

### Cystitis:

- increased frequency of micturition
- dysuria (i.e. pain or burning on micturition)
- slight rise in temperature.

### Pyelonephritis:

This is a more serious condition which presents with the following symptom and signs:

- dysuria
- spiking fever
- chills and general malaise
- increased frequency and urgency of micturition
- abdominal pain.

There may also be:

- retropubic/suprapubic pain
- loin pain/tenderness
- tenderness in rib cage
- anorexia
- nausea/vomiting.

## Tests/investigations to confirm diagnosis

Obtain a clean-catch, midstream specimen of urine (MSU) to reduce the likelihood of contamination with lochia.

Note the following:

- *colour* - it may be cloudy or bloodstained, often concentrated
- *odour* - it may have an offensive smell if infected
- *reaction* - usually acid
- *abnormal constituents* - protein, blood, pus.

A midstream specimen of urine (MSU) should be sent for bacteriological examination, including culture and sensitivity.

**Important**

For pyelonephritis, start a combination of antibiotics IV without delay, while awaiting results.

## CHECKLIST ✓

### D. Thromboembolic disorders

These include superficial thrombophlebitis and **deep vein thrombosis**.

#### History

(i) Superficial thrombophlebitis is more common in women who are:

- older
- obese
- of high parity.

There may be a history of varicose veins. Thrombophlebitis can also occur in veins which have been used for intravenous infusions.

(ii) Deep vein thrombosis has the following common risk factors:

- age over 35 years
- high parity
- obesity
- caesarean section
- trauma to the legs
- immobility
- dehydration and exhaustion
- smoking
- the administration of oestrogens
- previous history of thromboembolism.

#### Symptoms and signs

##### **Superficial thrombophlebitis:**

- may have fever
- red, inflamed, tender area over the vein
- vein feels firm on palpation from the clot lying within it.

##### **Deep vein thrombosis:**

- spiking fever, despite antibiotics
- calf pain may be present, or thigh or abdominal pain
- oedema and changes in leg colour and temperature may also occur
- pain in leg increased on walking.

#### Tests/investigations to confirm diagnosis

Superficial thrombophlebitis is usually obvious on clinical examination.

Deep vein thrombosis is more difficult to clinically diagnose in the early stages. Pain in the calf of the leg, especially when walking, is a suspicious symptom of deep vein thrombosis, in particular when accompanied by the above risk factors.

The following tests need more advanced skills and expensive technology. These include:

- real time ultrasound
- ascending phlebography
- isotope venography.

### **Important**

Deep vein thrombosis can lead to pulmonary embolism which is often fatal.

## CHECKLIST ✓

### E. Pneumonia

This includes many forms of disease that are not discussed in detail here. However, it is important for students to be able to recognize the basic cause of the woman's illness. Students must do this in order to start appropriate management and give good midwifery care. It is important to refer the woman to the next level of care for detailed assessment and specific management.

Infection may be acute or chronic.

Acute conditions include:

- bronchitis
- pneumonia
- pleurisy.

Chronic conditions include:

- pulmonary tuberculosis
- chronic bronchitis.

### History

The woman may have had a chest infection prior to labour/delivery. This will be the case in women with chronic conditions.

Women with pulmonary tuberculosis will often:

- be poorly nourished and anaemic
- be underweight and will continue to lose weight
- live in poor and overcrowded conditions
- give evidence of other members of the family similarly affected
- not have received a BCG vaccination, and may or may not be receiving treatment for TB.

**Acute chest infection is a common complication following the administration of a general anaesthetic. Therefore, women who have had a caesarean section under general anaesthetic are particularly at risk, and preventive measures are essential for post-operative care.**

### Symptoms and signs

- fever
- difficulty breathing
- cough with expectoration
- chest pain.

There may also be:

- consolidation
- congested throat



- rapid breathing
- rhonchi/rales.

**Tests/investigations to confirm diagnosis**

These include:

- careful clinical examination
- chest x-ray
- microscopy, including culture and sensitivity of sputum
- tuberculin testing e.g. Mantoux or Heaf test.

## CLINICAL PICTURE (A)

- Chills and general malaise

- May have light vaginal bleeding

- Fever 38°C or more

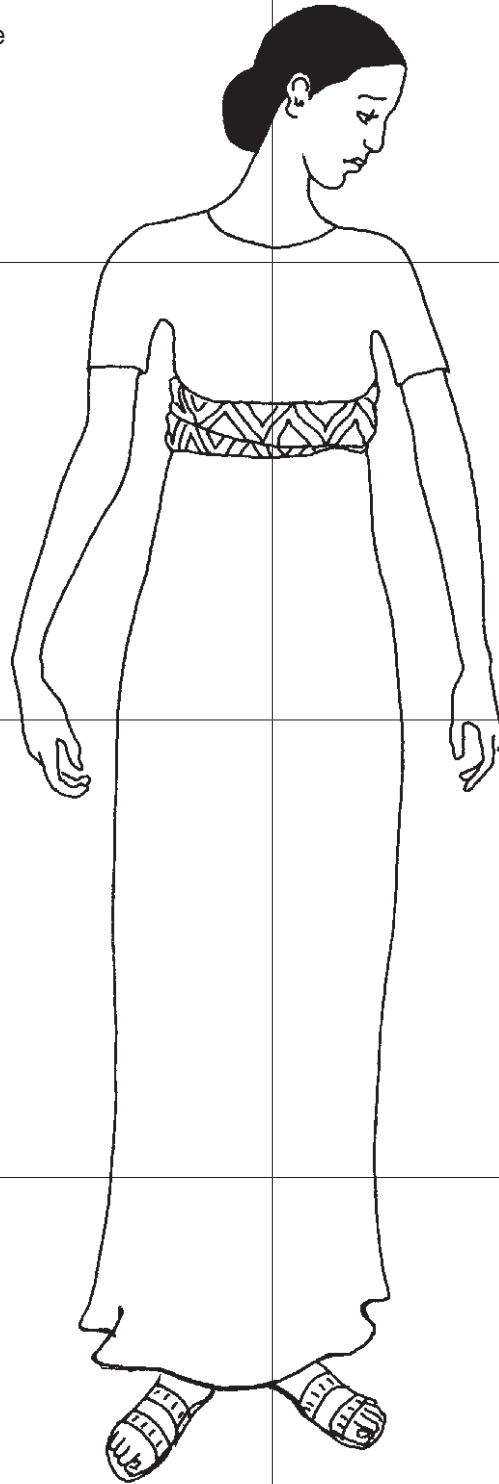
- Lochia:  
- purulent and foul smelling

- Uterus:
  - subinvoluted
  - fundal height stationary
  - feels soft and bulky
  - feels tender on palpation

- May have signs of shock

- Lower abdominal pain

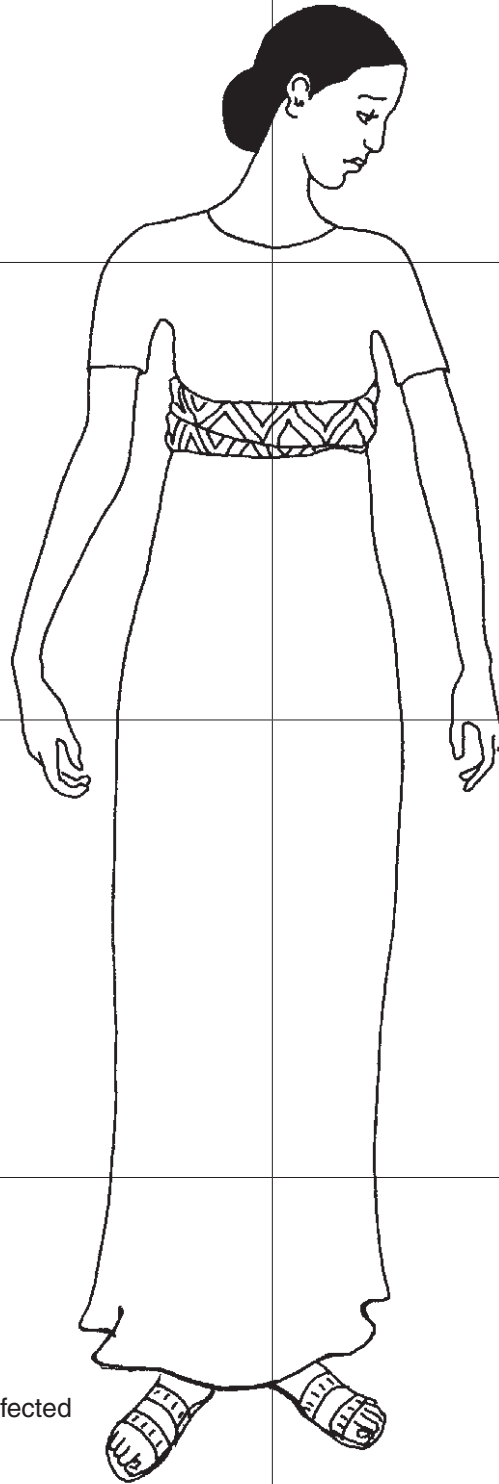
- May have pulmonary oedema



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## CLINICAL PICTURE (B)



- Redened, wedge-shaped area on breast

- May have nausea/vomiting and loss of appetite

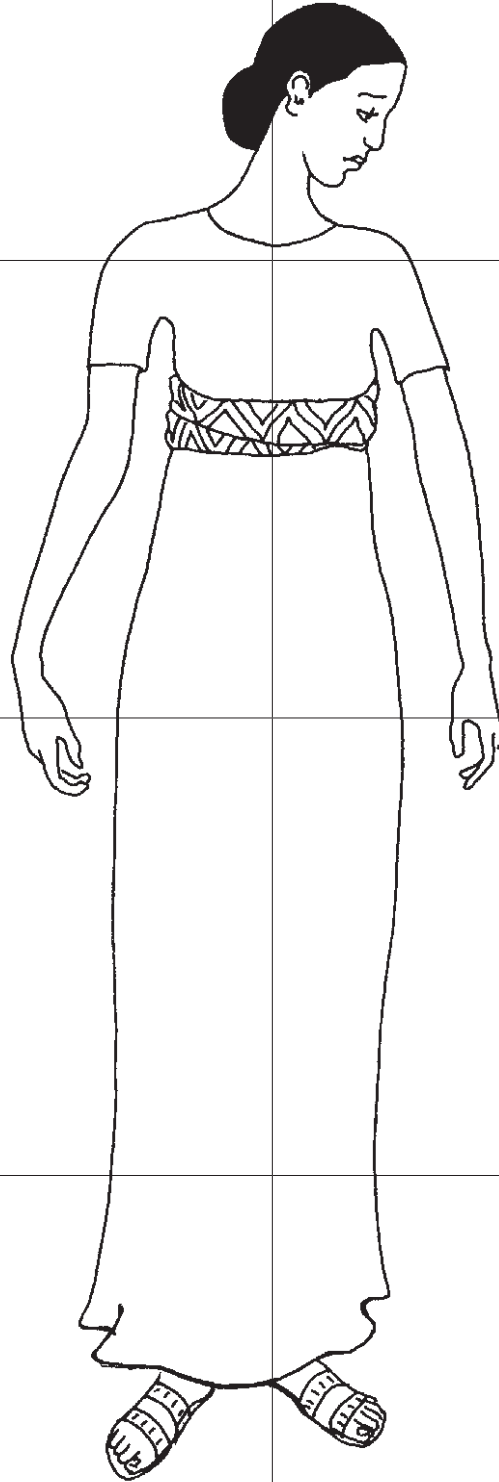
- May have breast inflammation preceded by engorgement

- Usually only one breast affected

- Usually occurs 3–4 weeks after delivery

# MASTITIS

## CLINICAL PICTURE (C)



- Spiking fever/chills

- Dysuria

- May have nausea/vomiting and loss of appetite

- Increased frequency and urgency of urination

- May have loin pain/tenderness

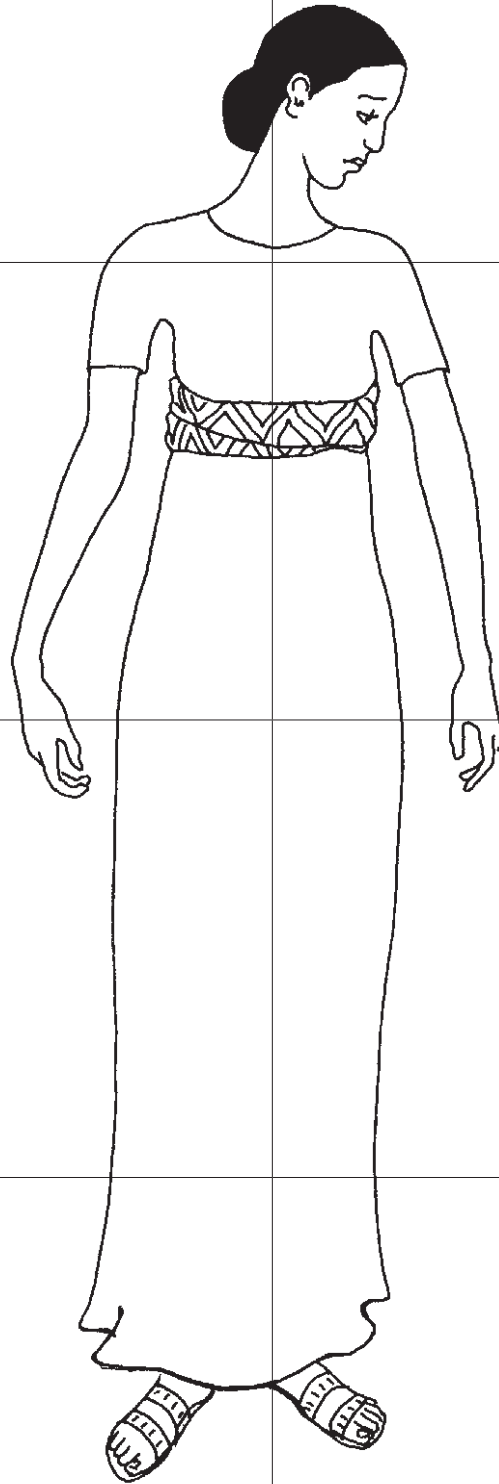
- Abdominal pain

- May have retropubic/suprapubic pain
- May have tenderness in lower abdomen or groin

**ACUTE**

**PYELONEPHRITIS**

## CLINICAL PICTURE (D)



- Spiking fever despite antibiotics

- May have pain and discomfort in calf muscle

- Pain in leg may be increased on walking

- May have oedema and changes in leg colour

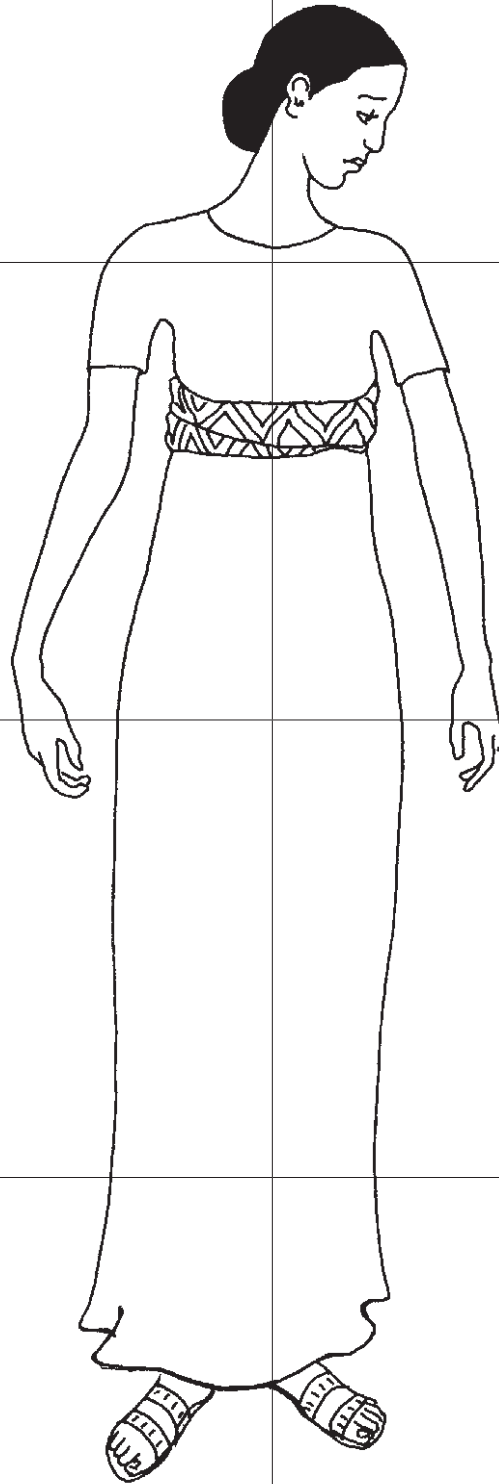


**DEEP**

**VEIN**

**THROMBOSIS**

## CLINICAL PICTURE (E)



- Spiking fever/chills

- Fever

- Throat may be congested

- Chest pain

- May have rapid breathing

- Difficulty in breathing

- Cough with sputum

# PNEUMONIA

# 4

## MANAGING PUERPERAL SEPSIS

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## SESSION 4

# MANAGING PUERPERAL SEPSIS

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### Aims

- To enable students to understand the necessary management in cases of puerperal sepsis.
- To enable students to effectively manage puerperal sepsis, referring the patient as appropriate.

### Objectives

On completion of Session 4, students will be able to:

- List the priorities for managing puerperal sepsis.
- Describe the management of puerperal sepsis.
- Explain the importance of prescribing and administering a suitable antibiotic regime in cases of puerperal sepsis.
- Identify the drugs which may be used, including the dose and route of administration.
- Explain the infection prevention practices applicable to managing puerperal sepsis.

### Plan

Lecture, discussion (2 hours).

Optional quiz.

### Resources

*Managing complications in pregnancy and childbirth: a guide for midwives and doctors.*  
Geneva, World Health Organization, 2003 (WHO/RHR/00.7).

Quiz on puerperal sepsis.

Equipment for demonstrating Universal Precautions (optional).

## INTRODUCTION

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*Remind students of the steps in providing effective management (see Session 3). The principles of managing puerperal sepsis are: speed, skills, priorities. Emphasize the importance of working quickly and according to priorities so that urgent things are done first.*

*The priorities in managing puerperal sepsis are:*

- *assess the woman's condition*
- *resuscitate the woman if necessary*
- *isolate the woman as soon as infection is suspected*
- *take specimens to investigate the causative organisms and confirm diagnosis*
- *start appropriate antibiotic therapy.*

*These are priorities. Explain to students that this means 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, e.g. if postnatal care is normally given in a particular order - this may need to be modified to allow urgent treatment to have priority over everything else.*

*Students should understand that admission formalities can waste time and the more routine parts of midwifery care can be carried out later.*  
**Remember, delay means death.**

## GENERAL MANAGEMENT OF PUERPERAL SEPSIS

### 1. Isolation and barrier midwifery care of the woman

The aim of this is to prevent the spread of infection to other women and their babies.

Basic principles of care are important. The midwife should:

- care for the woman in a separate room or, if that is not possible, in the corner of the ward, separated from the other women
- wear a gown and gloves when attending to the woman and remove the gown and gloves on completion of her care; these garments must **not** be used when attending to other women
- wash hands carefully before and after attending to this woman
- keep one set of equipment, dishes and other utensils exclusively for the use of this woman and make sure they are not used by anyone else
- ensure that soiled dressings are disposed of carefully, e.g. placed in a separate container which is emptied regularly and the dressings incinerated

- ensure that soiled linen is placed in a bag which is specifically marked for transport to the laundry, where it will be specially treated.

Where possible, a midwife/nurse should be allocated to care specifically for this mother and her baby. It may also be helpful to have a relative assist with their care. If so, the relative must be instructed in the basic principles of preventing the spread of infection. Visitors should be limited.

**Note:** See Infection Prevention Information in the following section.

## 2. Administration of antibiotics

These will normally be prescribed by a doctor. Where no doctor is available, midwifery personnel must know how to prescribe and give appropriate drugs. If current legislation does not allow this, it should be urgently reviewed.

Women will die of puerperal sepsis if treatment is inadequate or seriously delayed. Metritis (infection of the uterus after delivery) can result in pelvic abscess, peritonitis, septic shock, deep vein thrombosis, pulmonary embolism, chronic pelvic infection with recurrent pelvic pain and dyspareunia, tubal blockage and infertility. Prompt and effective treatment is therefore essential to prevent these complications arising.

### Choice of antibiotic

A combination of antibiotics is given until the woman is fever-free for 48 hours, and the following regime is recommended.

- ampicillin 2 g IV every 6 hours, **and**
- gentamicin 5 mg/kg body weight IV every 24 hours, **and**
- metronidazole 500 mg IV every 8 hours.

If fever is still present 72 hours after starting the antibiotic regime outlined above, the doctor will re-evaluate the woman and her treatment. Referral to a higher level health facility may be necessary.

Oral antibiotics are not necessary after stopping IV antibiotics.

### Tetanus toxoid

If there is a possibility that the woman was exposed to tetanus (if for example cow dung, mud or herbs were inserted into the vagina), and there is uncertainty about her vaccination history, give her tetanus toxoid.

## 3. Giving plenty of fluids

The aim of this is to correct or prevent dehydration, help to lower the fever and, if necessary, treat shock.

In severe cases, it is necessary to give intravenous fluids at first. If the woman is conscious and there is no likelihood of a general anaesthetic in the next few hours, she may also be given oral fluids.

#### 4. Ruling out retained placental fragments

Retained placental fragments can be a cause of puerperal sepsis. Suspect this if the uterus is soft and bulky, if lochia are excessive, foul-smelling and contain blood clots. Digital exploration of the uterus to remove clots and large pieces of placental tissue will be necessary. Ovum forceps or a large curette may be used, if required.

#### 5. Providing skilled midwifery care

This requires careful attention in order to promote the comfort of the woman and to aid her recovery. The following aspects of care are important:

- bed rest
- high standards of hygiene, particularly perineal and vulval care
- antipyretics and/or tepid sponging may be required if very high fever
- monitor vital signs, lochia, uterus for tenderness, involution, urinary output, and measure intake and output
- keep accurate records
- prevent the spread of infection and cross-infection.

When providing care for the woman, the midwife should be gentle, as rough handling increases pain and shock.

A kind, sensitive approach is important when speaking to the woman and her relatives. The woman is ill, and the midwife should demonstrate understanding and empathy with her and the family.

Any deterioration in the woman's condition should immediately be reported to the doctor. Referral to a higher level health facility will be required.

#### 6. Care of the newborn

**Unless the mother is very ill, the newborn can safely stay with her. However, precautions are necessary to prevent the infection passing from the mother to the newborn. Careful observation of the newborn is essential to recognize early signs of infection.**

*Remind students that infection in the neonate remain the major causes of neonatal deaths.*

- **Strict handwashing:** is essential when handling the newborn. If the mother is well enough to care for the baby, she should be instructed on the importance of handwashing, before and after handling the newborn
- **Breastfeeding:** if the mother is well enough, this can continue, but more frequent feeds may be required to maintain milk supply. If the mother is very ill, consult with a medical practitioner specializing in newborn care, and follow advice
- **Mother very ill:** if it is not possible for the newborn to be cared for by the mother, a close relative may be available to care for the baby until the mother is well enough. However, it must be emphasized that because the newborn is also at risk in developing an infection, close observation of the newborn



by a skilled health care professional must be made. The family should be advised that a change of behaviour in the newborn requires immediate skilled attention.

## 7. Further management

If there is no improvement with the above management and general peritonitis develops, a laparotomy will be performed to drain pus.

If the uterus is necrotic and septic, a subtotal hysterectomy may be necessary.

## 8. Managing complications

**The woman should be referred urgently to a higher level health facility for the management of all the following conditions, after emergency care.**

### Peritonitis

Generalized peritonitis is inflammation of the peritoneum. This means both the parietal peritoneum, the membrane which lines the abdominal wall, and the visceral peritoneum, which lies over the viscera or internal organs are inflamed. (see **Figure 1.2**, Session 1).

#### *Diagnosis:*

It is important to know how to recognize peritonitis. Peritonitis and/or multiple abscesses in the abdomen can follow caesarean section or ruptured uterus, or can be a complication of puerperal sepsis.

The following symptoms and signs are present.

- Fever/chills
- Rebound tenderness\*
- Abdominal pain
- Distended abdomen 3–4 days
- Nausea/vomiting
- Anorexia
- Absent bowel sounds
- Shock.

#### *Management of generalized peritonitis:*

Give first dose of antibiotics IV (see below).

Set up IV infusion and urgently transfer the woman to a higher level health authority for the following care:

- Nasogastric suction
- IV fluids
- Combination of antibiotics, as described for puerperal sepsis, e.g. ampicillin 2g IV every 6 hours, **and** gentamicin 5 mg/kg body weight IV every 24 hours, **and** metronidazole 500 mg IV every 8 hours.

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\* To elicit rebound tenderness, palpate the abdomen then release your hand suddenly: if there is peritoneal inflammation, this will be painful.

If necessary, a laparotomy will be performed for peritoneal washout.

## Septicaemia

Septicaemia is the presence and multiplication of bacteria in the bloodstream.

### *Diagnosis:*

- Fever/chills
- Fast pulse
- Woman very ill
- Delirium may occur
- Jaundice may develop.

### *Management of septicaemia:*

Start combination of IV antibiotics, as described above for puerperal sepsis.

- Give IV fluids
- Refer the woman without delay to a higher level health facility.

## Abscesses

### *Diagnosis:*

- Lower abdominal pain and distension
- Fever which is persistent, spiking/chills
- Tender uterus
- Poor response to antibiotics
- Swelling in adnexa or Pouch of Douglas on vaginal examination
- Pus obtained on culdocentesis.

### *Management of abscesses:*

- Start combination of antibiotics, as described for puerperal sepsis
- Start IV infusion
- Refer the woman to a higher level health authority for drainage of pus through cul-de-sac (i.e. through posterior vaginal wall into Pouch of Douglas), if abscess fluctuant (**Figure 5.1**)
- If spiking fever continues, a laparotomy will be performed.

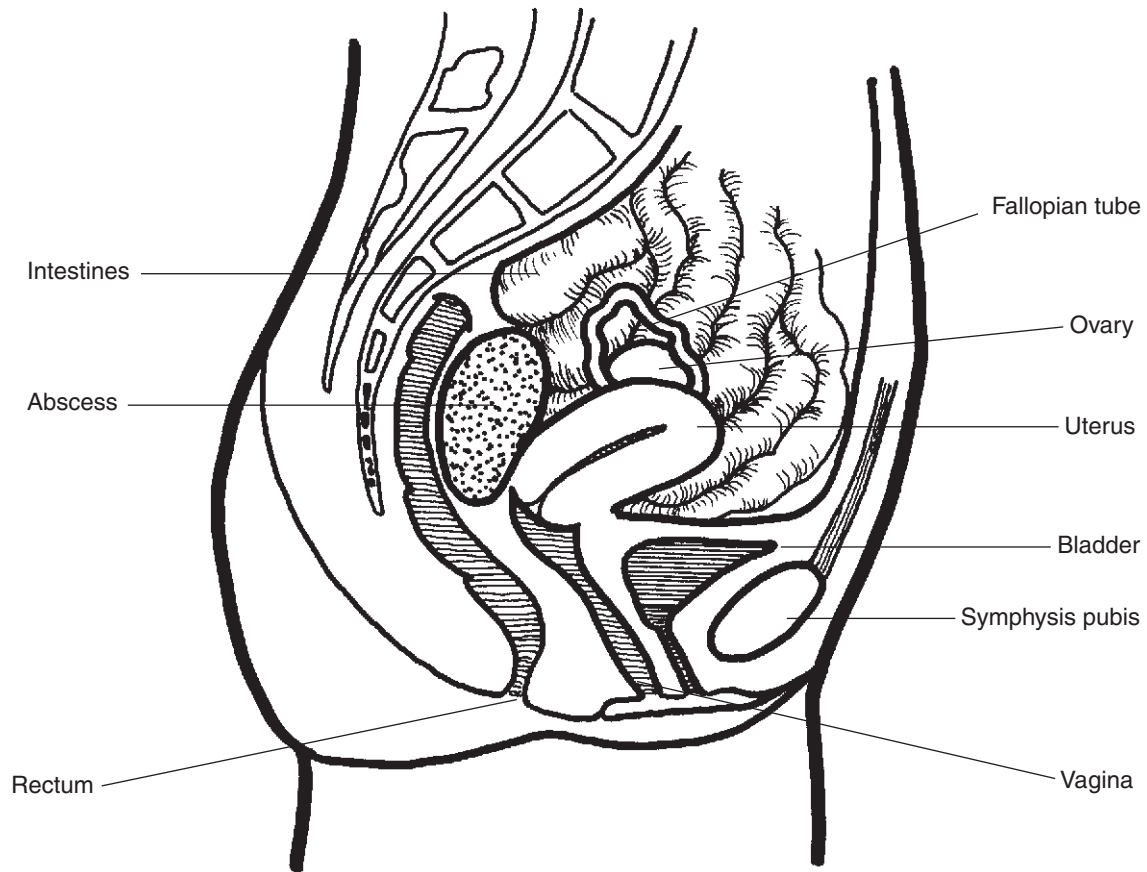
## 9. Managing infections of perineal and abdominal wounds

### Symptoms and signs of wound abscess, seroma or haematoma

- Usually tender wound with bloody or serous discharge
- Slight erythema (redness) extending beyond incision/edge of incision.

### Management

Refer to local protocol for management of surgical cases. If there is pus or fluid, the wound will need to be opened and drained. The wound will then be dressed with a damp dressing, which should be changed every 24 hours.



**Figure 5.1** Abscess in the Pouch of Douglas

Good hygiene is essential. If it is a perineal wound, stress the importance of wearing clean sanitary pads which must be changed frequently. Analgesics can be given, as required. Monitor vital signs.

**If there is wound cellulitis and necrotising fasciitis, but the infection is superficial:**

Treat as above, and also give antibiotics:

- ampicillin 500 mg by mouth 4 times a day for 5 days, **and**
- metronidazole 400 mg by mouth 3 times a day for 5 days.

Observe for the development of an abscess.

**If the infection is deep, involves muscle and is causing necrosis, (necrotising fasciitis):**

Give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours.

- penicillin G2 million IV every 6 hours, **and**
- gentamicin 5 mg/kg body weight IV every 24 hours, **and**
- metronidazole 500 mg IV every 8 hours.

When the woman is fever-free for 48 hours, give:

- ampicillin 500 mg by mouth 4 times per day for 5 days, **and**
- metronidazole 400 mg by mouth 3 times per day for 5 days.

Treatment in a higher level health facility will be necessary. Necrotising fasciitis requires surgical debridement (i.e. removal of all contaminated and devitalized tissue until the surrounding healthy tissue is exposed).

The wound dressing will need to be frequently changed, at least twice a day.

After 2–4 weeks, or when the infection is clear, the doctor will perform secondary closure of the wound.

## 10. Managing chorioamnionitis

### Symptoms and signs

- fever/chills
- foul-smelling water discharge after 22 weeks
- abdominal pain.

There may also be:

- history of loss of fluid
- tender uterus
- rapid fetal heart rate
- light vaginal bleeding.

### Management

Delivery should take place as soon as possible. The woman and her baby are both in danger of losing their lives:

- set up an IV infusion and start IV fluids;
- start antibiotics
  - ampicillin 2 g every 6 hours, **and**
  - gentamicin 5 mg/kg body weight every 24 hours.
- also give an antipyretic
- monitor for signs of shock
- transfer the woman without delay to a higher level health facility where skilled obstetrical and paediatric help is available. Be prepared for delivery and infant resuscitation during transfer.

If the cervix is favourable, (i.e. soft, thin and partly dilated), labour will be induced.

If the cervix is unfavourable (i.e. thick, firm, closed), it may be ripened with prostaglandins, and labour induced with oxytocin or the woman will be delivered by caesarean section.

### **Prevention of chorioamnionitis**

Advise all pregnant women to seek medical help as soon as they notice any fluid coming out from the birth canal. If the membranes are ruptured and the woman is not having contractions, do not do a vaginal examination.

If labour does not begin within 18 hours after the membranes rupture, give the mother prophylactic antibiotic treatment as follows:

- ampicillin 2 g IV every 6 hours, **and**
- gentamicin 5 mg/kg body weight IV every 24 hours.

Discontinue antibiotics after vaginal delivery.

If the woman is delivered by caesarean section, metronidazole 500 mg IV every 8 hours will also be given. The antibiotics will be continued until the woman is fever-free for 48 hours.

## **11. Managing tetanus**

Management of puerperal sepsis due to tetanus.

Transfer the mother to a higher level health facility immediately.

While waiting for transport or on the way to hospital:

- keep the woman lying on her side so that she will not inhale her secretions
- keep the airway open
- give the mother diazepam 10 mg IV slowly over 2 minutes to control spasms and lessen the chance of convulsions. Protect her from noise and light
- set up IV infusion to maintain hydration. Do not give fluids by mouth
- give antibiotics, benzyl penicillin 2 million units IV every 4 hours for 48 hours. This will be followed by ampicillin 500 mg by mouth 3 times a day for 10 days
- give tetanus antitoxin, 3 000 units IM.

In the higher level health facility, the cause of the infection will be removed, e.g. infected tissue.

Mechanical ventilation may be necessary.

There is high mortality with this condition.

*To be effective, the tetanus toxoid should never be frozen and must be kept below 8°C.*

*Use this table to discuss the WHO tetanus toxoid immunization schedule.*

**Table 1: WHO Tetanus toxoid immunization schedule**

Dose	When to give	Percent protection	Duration of protection
TT-1	At first contact or as early as possible in pregnancy	Nil	None
TT-2	At least 4 weeks after TT-1	80	3 years
TT-3	At least 6 months after TT-2 or during subsequent pregnancy	95	5 years
TT-4	At least 1 year after TT-3 or during subsequent pregnancy	99	10 years
TT-5	At least 1 year after TT-4 or during subsequent pregnancy	99	Throughout childbearing years

*Finally, ask if there are any questions.*

## INFECTION PREVENTION INFORMATION

*Infection prevention procedures are critical to the management of any complication in pregnancy and childbirth. Ask students to list the reasons why infection prevention practices are important. Write their responses on a blackboard or flip chart, which should include the following:*

- *to decrease the transmission of blood-borne pathogens such as HBV (hepatitis B virus) and HIV*
- *to protect patients*
- *to protect staff*
- *to protect the community.*

*Now ask students to list the five standard practices involved in “Universal Precautions”. Write their responses on the blackboard, which should include the following:*

- *handwashing*
- *use of protective barriers such as gloves, gowns, plastic aprons and goggles to prevent direct contact with blood and other body fluids*
- *safe decontamination of instruments and other contaminated equipment*
- *safe handling and disposal of sharps*
- *safe disposal of waste contaminated with blood and other body fluids.*

*Remind students that Universal Precautions are based on the assumption that all blood is potentially infectious, regardless of whether it is from a patient or health care worker. The Precautions aim to reduce, to an absolute minimum, the accidental exposure of patients and health care workers to potentially infectious blood.*

*Continue by reviewing the following infection prevention practices with the class. However, if the practices mentioned below have recently been covered in another module, they can be reviewed quickly. Depending on the needs and abilities of students, you may wish to demonstrate some of these practices.*

### Handwashing

Handwashing is important to reduce the spread of infection because the mechanical friction of washing with soap and water removes many of the pathogens responsible for disease transmission. Running water should be used rather than bowls of water (if piped water is not available, a clean, refillable container with a tap attached should be used). Either plain or antiseptic soap can be used. A clean towel should be used for drying hands. Do not use shared towels.

Hands should be washed at the following times:

**Before** performing a physical or pelvic examination or other procedure

**Before** putting on gloves

**After** handling used (soiled) instruments

**After** touching mucous membranes, tissue, blood or other body fluids

**After** taking off gloves

**Between** contact with different patients.

### **Glove use**

New gloves or gloves that have been high-level disinfected should be worn by health care workers when performing pelvic examinations and other procedures, especially when the hands might be exposed to blood or body fluids. Gloves must be changed between patients and between procedures.

Health care workers who clean or handle used instruments and who have the potential for contact with blood, should wear gloves when cleaning up after a procedure, disposing of waste or processing soiled linen. Thick utility gloves are preferable for these activities.

Gloves must be intact (i.e. must be free from holes, tears, cracks, peeling). They should be checked before use and any that have holes, tears, cracks or are peeling should be discarded.

### **Apron, gown and goggle use**

Plastic or rubber aprons should be worn for protection during procedures where splashing of blood or other body fluids is anticipated. During surgical procedures, where there is a high likelihood of splashing of blood, a fluid-repellent gown or a sterile cloth gown with a plastic apron underneath should be worn.

### **Decontamination of instruments**

Microorganisms left on surfaces or instruments by contact with blood or body fluids can transmit blood-borne infections to staff and patients. Instruments and surfaces should be processed appropriately to reduce the risk of transmitting infection.

The process required for cleaning reusable instruments or surfaces will depend on what they may have touched and what they will touch. Used instruments that may have touched and been contaminated by blood or body fluids should always be decontaminated with a 0.5% chlorine solution immediately after use. Decontamination makes instruments and surfaces safer to handle by killing many of the pathogens before further cleaning. It also makes instruments easier to clean.

Instruments and gloves that have been used should be placed in a 0.5% chlorine solution for 10 minutes immediately after a procedure. **Before placing the instruments into the chlorine solution**, they should be physically cleaned to remove all debris. This should be done with soap and under running water. Cleaning is essential before further processing, because removing material from the surface will allow solutions to contact the surface of the instruments. Chlorine can be corrosive to metal and therefore instruments should be removed after soaking for 10 minutes.

- *Instruments and gloves should be rinsed after decontamination*
- *Examination tables and surfaces that may have been contaminated should be*



*wiped clean with a chlorine solution*

- *Suction tubing used with electric aspiration pumps should be flushed with water immediately after use to remove blood and organic material.*

After decontamination, all reusable instruments need further processing. The choice of process will depend on what they will touch when they are used.

## **Cleaning**

After decontamination, all instruments should be washed thoroughly in warm (not hot) water and detergent. When high-level disinfection is to be carried out, cleaning is the last chance to physically remove bacterial endospores that are not killed by high-level disinfection.

Warm water with detergent is recommended for cleaning because hot water can coagulate protein, making it more difficult to remove. Detergent is needed because water alone will not remove proteins or oils and is preferable to soap, which may leave a residue.

It is important to wash all surfaces of instruments. Small brushes or cloths can be used to scrub items such as specula, forceps and needle holders. However, these should be cleaned after use and regularly replaced as they can be a source of infection transmission. All surfaces of instruments should be cleaned, paying special attention to crevices and joints where blood or tissue can collect.

After cleaning, instruments should be rinsed inside and out and then dried either with a clean towel or by allowing the air to dry them. If instruments are to be boiled, drying is not necessary.

Detergent and warm water should be used for routine cleaning of floors, beds, toilets, walls, and rubber draw sheets. All soiled linen should be handled as little as possible, bagged at the point of collection and not sorted or rinsed in patient care areas. If possible, linen soiled with large amounts of blood and other body fluids should be transported in leakproof bags. If leakproof bags are not available, the linen should be folded with the soiled parts inside and handled carefully, with gloves.

## **Sterilization and high-level disinfection**

Instruments that may have been in contact with blood, body fluid or tissue, should be sterilized. If this is not possible, high-level disinfection is the only acceptable alternative. Instruments in this category include cannulae, curettes, dilators, needles, syringes, and forceps. Processes for sterilization and high-level disinfection include:

- autoclaving (pressure steam)
- gas sterilization (using ethylene oxide)
- boiling
- soaking in chemical high-level disinfectants.

The appropriate method for sterilization or high-level disinfection depends on the type of instruments and the resources available at a facility.

Boiling is the most simple and reliable method for inactivating most pathogenic microbes, including hepatitis B virus and HIV, when sterilization either by steam or dry heat is not possible.

High-level disinfection should be achieved by soaking instruments in a solution of hypochlorite bleach [5 minutes contact at 20–25°C with buffered hypochlorite (pH = 7–8) at a concentration of 5000 ppm available chlorine], or fresh glutaraldehyde [5 hours contact at 20–25°C with 2% activated alkaline formulation (pH = 7.5–9)]. High-level disinfection destroys all microorganisms including hepatitis-B virus and HIV but does not reliably kill bacterial endospores. The use of phenol or antiseptics will not achieve high-level disinfection. Instruments must be rinsed with **sterile** water after disinfection.

### **Mid-level disinfection**

For instruments that do not contact the bloodstream or tissue beneath the skin, decontamination followed by washing and then mid-level disinfection is adequate if high-level disinfection is not possible. For example, syringes can be mid-level disinfected by soaking in alcohol (70–95% solution) or iodophors (10% solution). Both of these agents are easily inactivated by organic materials therefore it is important to change the solution if it becomes cloudy. Even if the solution does not become cloudy, alcohol solutions should be changed weekly or daily if used heavily; iodophors should be changed daily.

### **Storage of instruments**

Instruments must be stored appropriately to maintain sterility/high-level disinfection. Instruments (e.g. cannulae) that are sterilized in chemical solutions should be handled with sterile forceps. The instruments should be rinsed well with sterile water or saline, air dried, and wrapped in sterile paper or cloth, without touching the instrument or the inside of the sterile wrap. Sterile packages should be dated, stored in a clean, dry space, and used within one week. If they are not used within one week, the instruments must be recleaned and sterilized again.

Alternatively, sterile instruments may be stored in a sterile, covered container. Sterile technique must be maintained when removing or replacing the instruments. The container must be dated and resterilized weekly.

### **Handling and disposal of “sharps”**

Needles or “sharps” should be handled carefully during use and placed in a puncture-proof container immediately after use and should preferably be incinerated.

The greatest hazard of HIV transmission in health care settings is through skin puncture with contaminated needles or “sharps”. Most “sharps” injuries involving HIV transmission are through deep injuries with hollow-bore needles. Such injuries frequently occur when needles are recapped, cleaned, or disposed of inappropriately.

Puncture-resistant disposal containers must be available and readily accessible (i.e. at the point of use) for the disposal of “sharps”. Many easily available containers such as a tin with a lid, a thick plastic bottle with a lid, or a heavy plastic or cardboard box with a small opening in the top can be used as “sharps” containers. It is important to dispose of containers when they are three-quarters full, and to wear heavy-duty gloves when transporting “sharps” containers to the incinerator.

## **Waste disposal**

Disposable solid waste such as gauze and cotton, laboratory and pathology wastes should be placed in properly marked, leak-proof containers or plastic bags and then incinerated or buried in a 7 foot deep pit, at least 30 feet away from a water source.

Liquid wastes such as blood and tissue, excretions and secretions, should be carefully poured down a drain connected to an adequately treated sewer system, or disposed of in a pit latrine.

Remind students that these infection prevention practices will apply to the clinical skills in the following session(s).

*Ask if there are any questions.*

*Summarize.*



## Quiz on puerperal sepsis

This quiz will test the knowledge gained during the first five sessions of this module. You may wish to use it or adapt it for your students.

### How to use the quiz

- *Arrange for teams to use the quiz and compete with each other (this can be fun as well as educational).*
- *Give the quiz to each student and ask them to find the answers from their notes or books.*
- *Use the quiz as a test in class.*
- *Make a learning game out of the quiz such as the one called “Do you know?” in the postpartum haemorrhage module.*
- *Let the students make a learning game out of the questions.*

### Questions

1. *What is puerperal sepsis? (2 marks)*
2. *Name three sites of infection in puerperal sepsis. (3 marks)*
3. *Name three conditions which may cause fever in the puerperium and which are not associated with pregnancy. (3 marks)*
4. *What is septicaemia? (2 marks)*
5. *Why is a newly delivered woman at high risk of puerperal sepsis? (2 marks)*
6. *What three things do you need to do in order to make a diagnosis? (3 marks)*
7. *Name five risk factors for puerperal sepsis. (5 marks)*
8. *Why is it important to start antibiotics immediately in case of puerperal sepsis, rather than wait for the results of laboratory tests? (2 marks)*
9. *Name three risk factors for mastitis. (3 marks)*
10. *Name three risk factors for urinary tract infection. (3 marks)*
11. *What test will confirm the presence of urinary tract infection? (2 marks)*
12. *Name five risk factors for deep vein thrombosis (DVT). (5 marks)*

13. *What is the main danger of DVT? (2 marks)*
14. *What test can be done to confirm septicaemia? (2 marks)*
15. *Why is it important to start antibiotics immediately in the case of septicaemia, rather than wait for the results of laboratory tests? (2 marks)*
16. *What other condition may develop if septicaemia is not recognized and treated promptly? (2 marks)*
17. *What do the letters AIDS stand for? (2 marks)*
18. *What do the letters HIV stand for? (2 marks)*
19. *Name three ways in which HIV can be transmitted. (3 marks)*
20. *How many people are estimated to be infected with HIV in your own country? (2 marks)*
21. *Suggest three ways in which HIV infection can be avoided. (3 marks)*
22. *List when it is important to wash your hands to prevent infection. (3 marks)*
23. *What effect may delay have on women with puerperal sepsis? (2 marks)*
24. *If delay means death, what can speed do? (2 marks)*
25. *Why is it important to isolate a woman who has a fever and is suspected of having puerperal sepsis? (2 marks)*
26. *Why is it important to provide barrier midwifery care for a woman who has a fever and is suspected of having puerperal sepsis? (2 marks)*
27. *Why is a combination of antibiotics given for the treatment of puerperal sepsis? (2 marks)*
28. *Suggest a suitable antibiotic regimen which should be prescribed immediately for a woman with puerperal sepsis. State the drugs and doses you would give. (5 marks)*
29. *Why is it important to give plenty of fluids to a woman with a fever? (2 marks)*
30. *Describe five symptoms and signs that would make you suspect peritonitis. (5 marks)*
31. *State two actions you must take if peritonitis is present. (2 marks)*
32. *What are the symptoms and signs of puerperal sepsis? (5 marks)*
33. *What are the symptoms and signs of chorioamnionitis? (5 marks)*

34. *What is parametritis? (2 marks)*
35. *What is the definition of an avoidable factor? (1 mark)*
36. *State three things you can do to prevent puerperal sepsis? (3 marks)*
37. *State two things you can do when a woman has prolonged rupture of membranes to prevent chorioamnionitis. (2 marks)*
38. *State two things you can do or advise to prevent breast abscess? (2 marks)*
39. *Which women will be most at risk of infection from tetanus? (2 marks)*
40. *If a woman complains of tenderness on palpation of the uterus in the puerperium, what other signs would you look for and why? (6 marks)*

**Total possible marks = 110**



## Answers

*Students are not required to give the exact wording of the printed answer. However, the teacher should assess how well they explain the meaning.*

*Award full marks for accurate recall of facts, and/or clear explanation of important issues.*

*Use discretion to award some marks for a partly correct answer. Do not do this, however, if the answer could in any way be dangerous.*

1. *Puerperal sepsis is any bacterial infection of the genital tract which occurs after the birth of the baby, usually after the first 24 hours.*
2. *Accept any three correct answers:*
  - *the uterus (placental site)*
  - *the cervix (tear)*
  - *the vagina (tear)*
  - *the perineum (episiotomy or tear).*
3. *Accept any three correct answers from the following:*
  - *chest infections*
  - *malaria*
  - *typhoid*
  - *dysentery*
  - *meningitis**or any other correct answer.*
4. *Septicaemia occurs when pathogenic bacteria are present in the bloodstream.*
5. *A newly delivered woman is at high risk because:*
  - *the placental site is warm, moist, dark and rich in blood supply (this encourages the growth of bacteria)*
  - *the cervix is slightly open and therefore bacteria can enter the uterine cavity*
  - *the genital tract is close to the anus which allows pathogenic bacteria to easily enter the vagina.*
6.
  - (a) *Take a history.*
  - (b) *Clinical examination.*
  - (c) *Tests/investigations may be performed to confirm the diagnosis.*

7. *Accept any five correct answers from the following:*

- *prolonged labour*
- *obstructed labour*
- *dehydration and exhaustion*
- *prolonged rupture of membranes*
- *frequent vaginal examinations*
- *manipulations high in the birth canal*
- *poor aseptic technique*
- *interference involving introduction of unclean hands or foreign bodies into the vagina*
- *retained fragments of placenta or membranes*
- *anaemia.*

8. *Because the infection rapidly enters the general circulation from the placental site. Also because this causes septicaemia which can be rapidly fatal.*

9. *Accept any three correct answers from the following:*

- *breast engorgement*
- *cracked nipple*
- *difficulty in fixing baby to breast may lead to nipple damage*
- *bruising of breast tissue (due to rough handling).*

10. *Accept any three correct answers from the following:*

- *physiological changes in pregnancy which cause stasis of urine*
- *trauma during labour*
- *catheterization during labour*
- *poor vulval hygiene*
- *anaemia.*

11. *A midstream specimen of urine (MSU) sent to the laboratory for bacteriological examination (for 2 marks must have both the name of the test, and that the test needs to be sent to the laboratory).*

12. *Accept any five correct answers from the following:*

- *age over 35 years*
- *high parity*
- *obesity*
- *caesarean section*
- *trauma to legs*
- *immobility*
- *dehydration and exhaustion*
- *smoking*
- *use of oestrogens; history of oestrogen intake over a long period of time (e.g. oral contraception).*



13. *Pulmonary embolism.*
14. *Blood cultures.*
15. *Because septicaemia can rapidly cause death.*
16. *Septic shock.*
17. *Acquired immune deficiency syndrome.*
18. *Human immune deficiency virus.*
19. *Accept any three correct answers from the following:*
  - *sexual intercourse*
  - *exposure to blood, blood products, body fluids*
  - *contaminated syringes, needles, other equipment*
  - *from mother to fetus before birth\**
  - *from mother to baby soon after birth\**
  - *exposure to transplanted organs or tissues.*

*\* i.e. perinatal transmission.*
20. *Insert your own figure for this question.*
21. *Accept any three correct answers from the following:*
  - *keeping to one partner within marriage*
  - *avoiding promiscuity*
  - *use of condoms during sexual intercourse*
  - *abstinence from sexual intercourse*
  - *investigation and management of all sexually transmitted diseases*
  - *screening of all blood for transfusion for HIV*
  - *avoiding IV drug abuse, and particularly sharing syringes/needles*
  - *use of gloves, goggles and protective clothing for staff during delivery/surgery.*
22. *Before performing a physical or pelvic examination or other procedure.*

*Before putting on gloves.*

*After handling used (soiled) instruments.*

*After touching mucous membranes, tissue, blood or other body fluids.*

*After taking off gloves.*

*Between contact with different patients.*
23. *Delay means death.*
24. *Speed can save life.*

25. *Because infection can rapidly spread to other mothers and babies.*
26. *To reduce the risk of cross-infection, i.e. infection being spread to other mothers and babies.*
27. *Because a combination of organisms may cause the infection, and the organisms involved are not known until culture and sensitivities to the organisms are available. A combination of antibiotics is more likely to be effective against a range of organisms, e.g. both aerobic and anaerobic microorganisms.*
28. *Ampicillin 2g IV every 6 hours, and  
Gentamicin 5mg/kg body weight IV every 24 hours, and  
Metronidazole 500mg IV every 8 hours.*
29. *Because it will help reduce the fever and avoid dehydration.*
30. *Peritonitis will cause:*
- *fever/chills*
  - *lower abdominal pain*
  - *abdominal distension*
  - *rebound tenderness*
  - *vomiting*
  - *absent bowel sounds*
  - *shock.*
31. (a) *Set up an intravenous infusion (IVI).*  
(b) *Pass a stomach tube for naso-gastric suction.*  
(c) *Give antibiotics.*
32. *The symptoms and signs of puerperal sepsis are:*
- *fever 38°C or more*
  - *chills and general malaise*
  - *lower abdominal pain*
  - *tender uterus*
  - *subinvolution, i.e. higher than expected for the stage of the puerperium*
  - *foul-smelling lochia*
  - *there may be an infected wound*
  - *in severe cases shock.*
33. *Fever and fast pulse*
- *tender uterus on palpation*
  - *foul smelling amniotic fluid draining*
  - *the baby also has a fast heart beat (above 160/min.)*
  - *there is history of prolonged rupture of membranes.*

34. *Infection of the parametrium.*
35. *Factors which make a condition more likely to happen or more dangerous.*
36. *Accept any three correct answers from the following:*
- *avoid unnecessary interference during labour*
  - *ensure clean delivery*
  - *identify prolonged labour and refer, as appropriate*
  - *treat pre-existing sexually transmitted diseases*
  - *immunize pregnant women against tetanus.*
37. (a) *Give prophylactic antibiotics when membranes have been ruptured for 18 hours.*  
(b) *Refer to the next level of care for assessment and possible induction of labour.*
38. *Accept any two correct answers from the following:*
- *treat cracked nipples promptly*
  - *teach the mother to ensure that her baby is always correctly latched onto the breast*
  - *before removing the baby from her breast, teach the mother to always first release the suction which the baby has on the breast*
  - *avoid stasis of milk*
  - *promote breast hygiene.*
39. *Women most at risk will be those who:*
- *have not been fully immunized against tetanus*
  - *have been subjected to traditional practices which place them at risk (earth/soil, or cow dung inserted into the vagina is dangerous).*
40. *Also look for:*
- *offensive lochia*
  - *fever*
  - *fast pulse*
  - *lower abdominal pain*
  - *subinvolution*
  - *shock.*

# 5

## LEARNING CLINICAL SKILLS

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## SESSION 5

### LEARNING CLINICAL SKILLS

#### Aims

- To enable students to gain competence and confidence in using the clinical skills that are essential for treating and providing care for a woman with puerperal sepsis.

#### Objectives

On completion of Session 5, students will be able to:

- Identify the factors which place a woman at increased risk of puerperal sepsis, explain reasons for the increased risk and demonstrate how risks may be reduced.
- Perform a full clinical examination of a puerperal woman and identify symptoms and signs of sepsis.
- Demonstrate the ability to accurately monitor the woman's vital signs.
- Demonstrate the ability to obtain a midstream specimen of urine.
- Demonstrate the ability to take blood for analysis and culture.\*
- Demonstrate the ability to set up and monitor an intravenous infusion, stating the reasons for doing so, the precautions to be taken and the records to be kept.\*
- Describe the importance of adequate fluid intake and demonstrate the ability to monitor intake and output.
- Explain the prescription, ordering, storage and administration of antibiotics, antipyretics and analgesics, and demonstrate the ability to administer the necessary drugs.\*
- Demonstrate the ability to carry out a perineal wash correctly and recognize any signs of infection.
- Describe the risks of thromboembolic disorders and demonstrate how these risks can be minimized.
- Explain the importance of adequate fluids and a light, nourishing diet with added dietary supplements to help aid recovery. Demonstrate how this can be provided to encourage a sick woman to eat.
- Describe the importance of prevention of cross-infection and demonstrate effective isolation and barrier midwifery care of a woman suffering from puerperal sepsis.
- Demonstrate the ability to maintain accurate records.

#### Plan

Lecture (2 hours).

Clinical teaching - approximately 2 hours per small group of students per skill, and additional time for individual practice and assessment.

#### Resources

*Managing complications in pregnancy and childbirth: a guide for midwives and doctors.*  
Geneva, World Health Organization, 2003 (WHO/RHR/00.7).

Equipment for demonstration/simulation practice.

Checklists for assessing competence.

\* These objectives may already have been achieved by students who have completed the postpartum haemorrhage, or prolonged and obstructed labour modules.

## INTRODUCTION

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*The clinical skills in this session constitute a critical component of the module. In teaching these skills, you may wish to collaborate with another midwifery teacher, practicing midwives or obstetricians. When learning these skills, students should have consistent supervision.*

*Each skill is organized under three headings: **Teaching method**, **Teaching content**, and **Assessing competence**. While it is important for the teacher to use the information included under each of these headings, it is critical to carefully follow the guidelines for assessing competence in each of the skills. It may, therefore, be helpful to extract these guidelines and **develop a checklist**, which should include a space for the comments of both the teacher and student, for each of the skills. Copies of the forms could then be used for each student being assessed. Some of the skills in this session are basic nursing skills, which are important for students of midwifery to be able to use in midwifery practice.*

*Remind students that the infection prevention practices described with respect to managing puerperal sepsis in Session 4, also apply to the skills in this session.*

### **SKILL: IDENTIFYING FACTORS WHICH PLACE A WOMAN AT INCREASED RISK OF PUERPERAL SEPSIS**

#### **Teaching method**

*Divide the students into groups of two or three. In the clinical area or during a home visit, they should:*

- 1. Select a woman (in labour/newly delivered).*
- 2. After obtaining permission from the nurse/midwife responsible for care, the woman herself and her relative(s) if appropriate, read her history in the case notes.*
- 3. Talk to the woman and update any details in her records.*
- 4. Carry out a full clinical examination of the woman.*
- 5. As these steps are carried out, identify factors which place the woman at increased risk of puerperal sepsis.*

*Check the findings of the students at the bedside/in the home.*

## Teaching content

Important risk factors for puerperal sepsis can be identified by history taking and reading the records. Ask questions such as:

- How long was the woman in labour?
- Were the membranes ruptured for many hours before labour started?
- Who delivered the baby and where. Was the delivery clean. Were substances inserted in the vagina (cow dung, mud, herbs, etc.)?
- Did the woman undergo a caesarean section or other operative delivery?
- Was there excessive haemorrhage after the birth?
- Did the woman have sexually transmitted infections during pregnancy (history of greenish or yellowish offensive or irritating discharge)?
- Does the woman have diabetes or anaemia?
- Has the woman ever been immunized against tetanus?

Other risk factors can be identified by physical examination.

- Evidence of anaemia (e.g. palmar and conjunctival pallor; breaths more than 30 per minute)
- Suspicion of retained placental fragments: uterus soft and bulky, lochia are excessive and contain blood clots
- Unrepaired vaginal or cervical lacerations are present.

## Assessing competence

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Is the student able to recognize the risk factors?*
  - *from the written records?*
  - *from her/his own history taking?*
  - *from clinical examination?*
2. *Can the student explain why there is a risk?*
3. *Does the student know what must be done to ensure the risk is avoided or minimized?*

## **SKILL: FULL PHYSICAL EXAMINATION, IDENTIFYING SYMPTOMS AND SIGNS OF PUERPERAL SEPSIS**

*It is assumed that students already have experience of carrying out a postnatal examination.*

**Teaching method**

*Divide the students into groups of two or three. In the clinical area or during a home visit, they should demonstrate a full clinical examination of a puerperal woman.*

**Teaching content**

Before starting the examination, ask the woman to empty her bladder.

Physical examination should include the following:

1. Vital signs: Temperature, pulse, respirations and blood pressure. However, note any fever and/or fast pulse, and/or rapid respiratory rate.

Note blood pressure.

2. Ask the woman
  - how she feels
  - if she has any pain
  - if she has any problems or symptoms that worry her.
3. Note colour, vitality, mood. Does she look well or ill?
4. Examine the woman from head to toe.

**Examination*****Head***

Note signs of fever (include flushed or high colour and hot forehead) and headache.

***Neck***

Check for enlarged glands and sore throat.

***Breasts***

Observe:

- any inflammation
- any swelling
- whether lactation is established
- any nipple soreness or cracks.

Palpate very gently and note:

- pain/discomfort
- any swelling, hot areas, lumps
- hard areas (are the breasts engorged?)
- abnormal discharge from the nipples (is there any pus or blood draining?)



### *Chest*

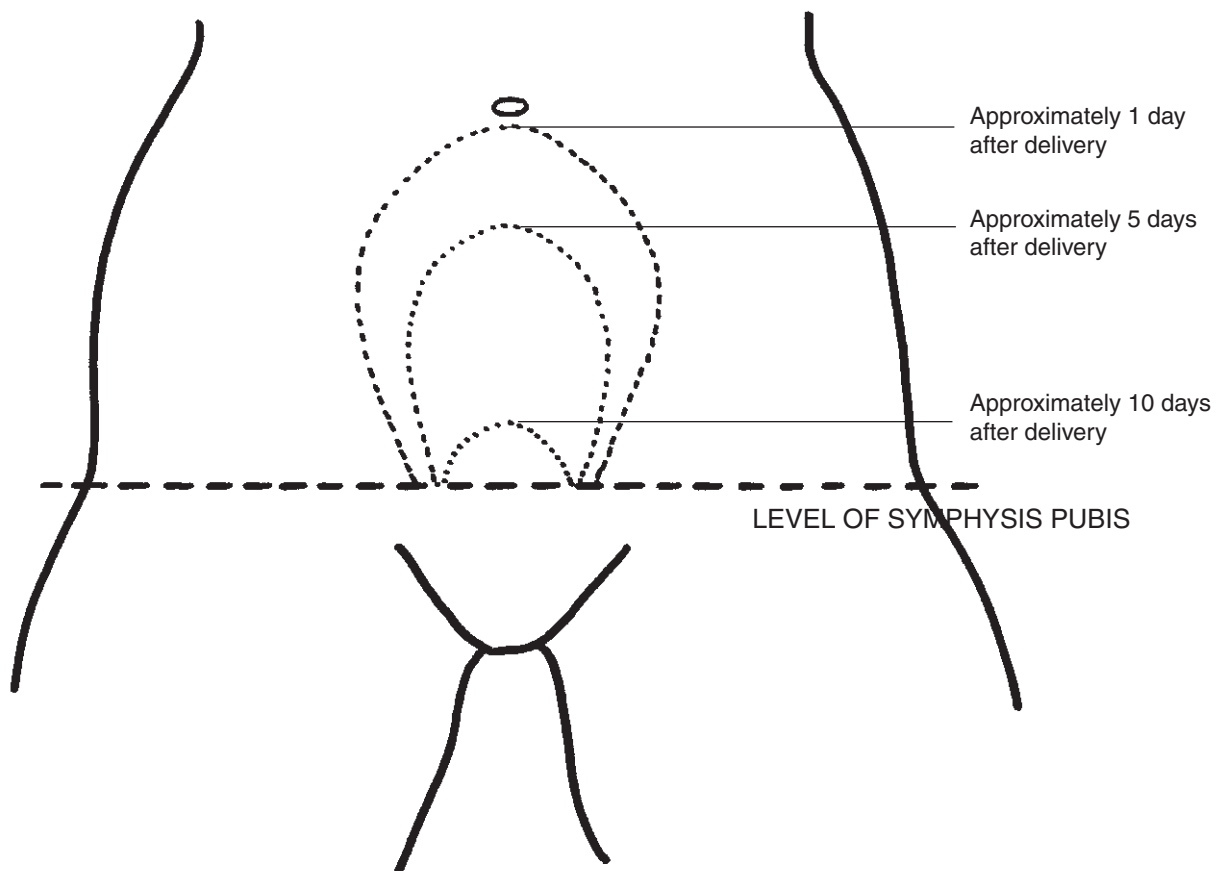
Auscultate (listen) and note:

- abnormal breath sounds (e.g. crepitations or rales)
- whether the patient has a cough
- if there is any sputum.

### *Abdomen*

Palpate the bladder to check that there is no retention of urine.

- observe any abdominal wounds: (are they clean or is there a discharge)?
- palpate very gently
- feel for the fundus
- measure or estimate the height of the fundus: (Does it correspond with what is expected at this stage of the puerperium?) (**Figure 6.1** gives a guide to fundal height)
- check for any pain or tenderness of the uterus: (This is very important. The uterus should not be tender a day or two or more after delivery. A tender uterus means infection or sepsis. Sepsis can lead to death)
- check if the uterus feels firm: (The uterus should feel firm. If the uterus feels soft or bulky, this means that it is not involuting properly. Retained products or sepsis may be the cause of this).



**Figure 6.1** Fundal height after delivery

### ***Lochia***

Note:

- the colour
- the amount
- whether there are any blood clots or pieces of placenta or membrane
- the smell.

Normal lochia changes from red to pink/brown within the first few days, then becomes a whitish discharge. It should not be excessive nor contain blood clots. Small pieces of membrane may be passed at first. Lochia has a characteristic smell, but this should not be offensive. Foul-smelling lochia is a sign of infection.

### ***Perineum***

Is there a wound/episiotomy? If so, is it clean, is it healing? Is there discharge, inflammation or swelling?

### ***Urinary tract***

Is the urinary output good? There should be a marked diuresis after delivery.

Is there pain or burning on urination?

Problems in passing urine may be due to:

- bruising
- lacerations
- oedema.

These can affect the bladder or urethra.

Fear of pain or actual pain due to episiotomy or perineal lacerations can also interfere with urination.

Check for tenderness over the kidneys. Percuss, i.e. tap sharply the lower back over each kidney using your fist. Also check if pain radiates to the groin. These signs are often present when there is urinary tract infection.

Does the urine smell bad?

This must be distinguished from offensive lochia.

### ***Legs***

Check for any:

- pain
- swelling
- inflammation
- hardness over superficial veins.

This suggests superficial thrombophlebitis. Check for pain or tenderness in the calf of the leg, pain in the calf when walking. This suggests deep vein thrombosis. Is there any oedema of legs?

### **Baby**

Does the baby have any signs of infection? Inspect the baby's:

- eyes
- mouth
- umbilicus
- skin and nails.

## **Assessing competence**

*When assessing students, make sure they can demonstrate a full physical examination, which includes all the points mentioned in the teaching content.*

## **SKILL: TAKING AND RECORDING VITAL SIGNS**

### **Teaching method**

*Here students concentrate on taking and recording temperature, pulse and respiration (TPR) in a puerperal woman.*

*Students can practise measuring and recording each other's temperature, pulse and respiration. It is easy to check for accuracy and make sure that students can record and read the charts correctly.*

*As soon as students are able to use these basic but important skills, accompany them into the clinical area and put their skills to use. Look at charts of puerperal women and identify any cause for concern. Emphasize the need to be concerned about a raised pulse rate even if the temperature is normal. Refer to diagnostic facts learned in Session 3 this module.*

### **Teaching content**

*It is important that students understand:*

- the importance of carefully monitoring the temperature and pulse in the days following delivery
- that pulse rate can accompany fever, and that sometimes the pulse rate goes up even before the temperature rises
- the importance of accuracy in taking and recording observations
- the importance of immediately investigating any abnormality, especially when the temperature is 38°C or more
- the great danger of delaying investigation and management in cases of puerperal sepsis.

*Make sure that students know how to use a thermometer. Give them the opportunity to practise the following, as it is not as easy as it may seem.*

- reading the thermometer
- shaking it

- *timing it in position (axillary temperatures are usually taken)*
- *avoiding contamination between one patient and the next.*

*Avoiding contamination is very important. Make sure that students understand that the thermometer needs to be left under the arm for five minutes to obtain an accurate reading.*

*Students should know how to record temperatures on the woman's chart.*

## **Assessing competence**

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Can the student explain the importance of recording temperature, pulse and respiration accurately in a puerperal woman?*
2. *Can the student take the TPR correctly and interpret her/his findings?*
3. *Can the student correctly record her/his observations on a chart?*
4. *Does the student know the normal range for temperature, pulse and respiration?*
5. *Can the student explain the findings to the mother, and answer her questions?*
6. *Does the student inform a doctor and take appropriate action when there is a fever? (e.g. take appropriate swabs and specimens for bacterial investigation and start antibiotics).*

## **SKILL: TAKING MIDSTREAM SPECIMEN OF URINE**

### **Teaching method**

*This subject is best taught in the clinical situation. If possible, it would be good for students to visit the laboratory. Arrange for a senior technician to explain the tests carried out. Where there is no easy access to the laboratory you should ensure that students can carry out ward testing of urine. They should examine for the presence of pus, as well as the colour and odour of the specimen.*

### **Teaching content**

*Ensure that students understand the purpose of sending a midstream specimen of urine (MSU) in order to establish whether the specimen contains bacteria.*

When analyzing results, remember:

- the level of up to 100 000 per ml is considered within normal limits

- a level in excess of this, but without symptoms, is called asymptomatic bacteriuria
- with symptoms of urinary tract infection, the bacterial count will be higher.

The laboratory will examine the specimen for the presence and quantity of bacteria, pus cells and blood cells. The urine will also be cultured to see which bacteria grow. Their sensitivity to antibiotics will be tested.

### How to take a midstream specimen of urine

*It is important to make sure that the specimen is as clean as possible. For this reason the students must understand that it is essential to avoid contamination. The specimen can be very easily contaminated by lochia as well as bacteria from the anus in the newly delivered woman. Research has shown that the most effective way of avoiding contamination of the specimen is to ensure that the woman separates the labia while passing urine.*

*Remind students that it is better to take an early morning specimen as it will be more concentrated.*

**In order to obtain a clean and uncontaminated specimen of urine, it is important to instruct the woman as follows:**

She should clean her vulva with clean water, always taking care to wipe from front to back. This avoids contaminating the vagina with bacteria from the anus. She should then part the labia with her fingers in order to reduce contamination of the urine during micturition.

She then collects a midstream specimen of urine (a full bladder will make this easier) by passing urine normally and, without stopping, catching the **middle part of the flow** in a clean container. She should be careful not to touch the inside of the container with her fingers or any other part of the body. Having obtained the specimen, she removes the container and finishes passing urine in the toilet.

### Assessing competence

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Is the student able to explain the purpose of obtaining a midstream specimen of urine?*
2. *Is the student able to explain to the woman how to obtain the specimen without contamination?*
3. *Does the student provide the woman with what she needs in order to wash the vulva? Does he/she instruct her to separate the labia?*
4. *Does the student provide a clean and sterile specimen jar and correctly label it?*

5. *Does the student complete the laboratory request forms correctly?*
6. *Does the student ensure that the specimen is sent immediately to the laboratory?*

## **SKILL: TAKING BLOOD SAMPLES FOR ANALYSIS**

### **Teaching method**

*This can be taught in the classroom, or clinical area. However, before going to the clinical area, ensure the principles have been covered.*

*Students should be familiar with the anatomical location of the veins of the arm. They should be able to identify the veins of the cubital fossa which are most easily accessible for venepuncture - i.e. the median cubital vein, or cephalic vein (**Figure 6.2**).*

*Help students to identify these veins on their own arms. This will be easier when pressure is applied to the upper arm, or a tourniquet is applied (**Figure 6.3**).*

*It is advisable to help students first obtain blood specimens from healthy women in an antenatal clinic, before they attempt taking a blood sample or an intravenous infusion (IVI) in an emergency.*

*Use of a tourniquet should also be taught in the classroom before students apply these in clinical practice.*

*The blood tests you teach should include at least haemoglobin, grouping and cross-matching.*

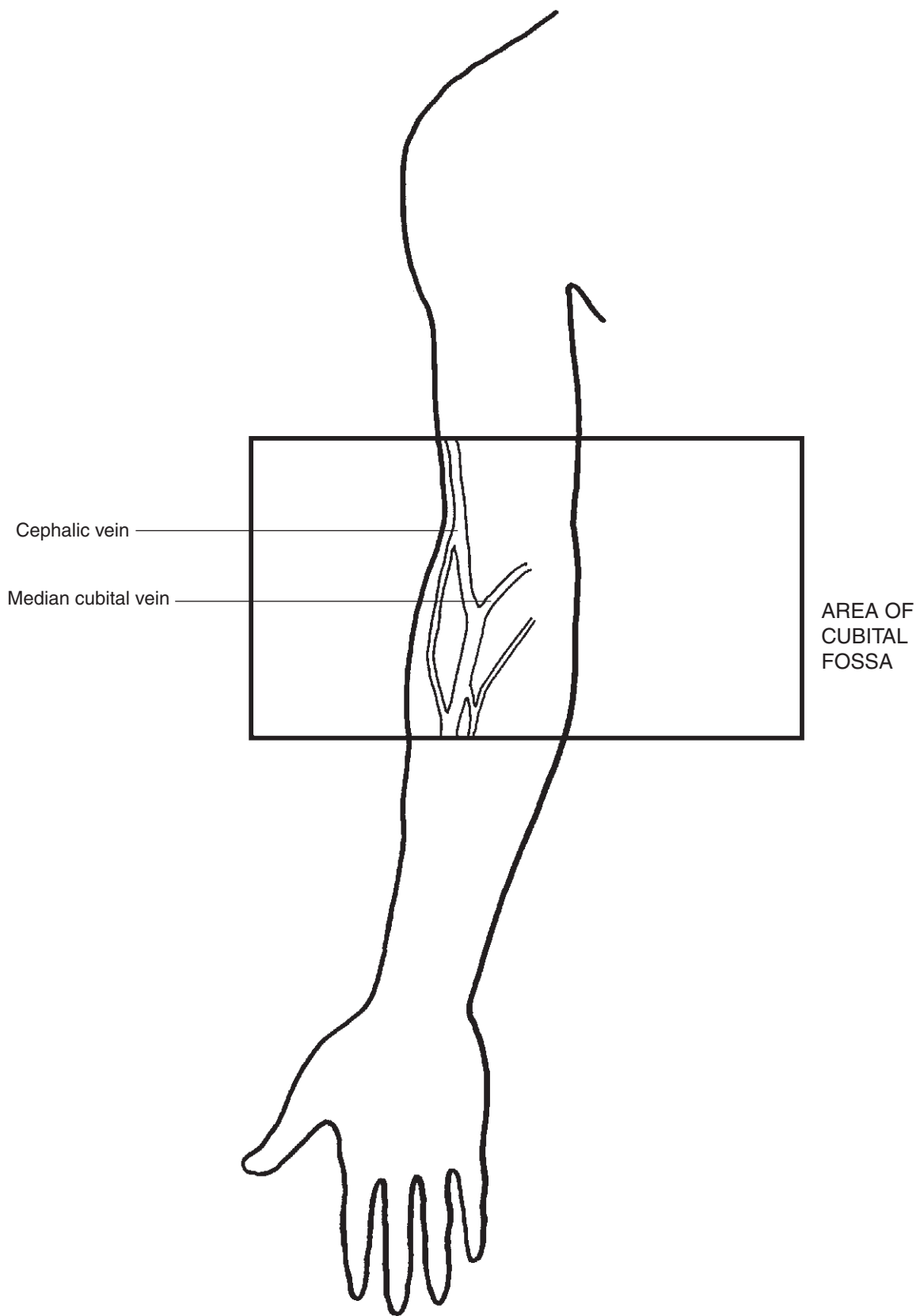
*Students should also be taught about the test tubes necessary for transporting the blood, as well as the laboratory request forms and how to fill them in. Emphasize the importance of accurate, clear labelling.*

*In addition, students should know the correct procedure to use in obtaining a specimen for blood culture. It is sometimes possible to make good cultures in the laboratory from clotted blood taken, but it is much better to inject the blood into a culture medium.*

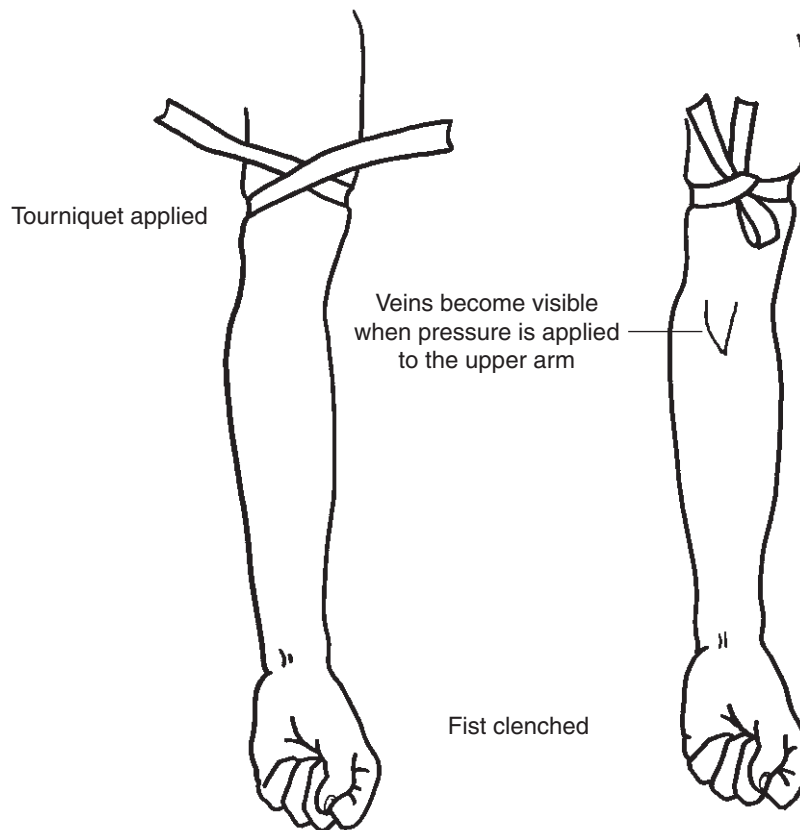
*It would be wise to consult laboratory staff about this procedure and again arrange some practical teaching and demonstration by them.*

*You will also need to have any ward procedure or policy available for reference.*

*Finally, students should be reminded of the necessity to protect the woman, herself/himself and any assistant(s) against accidental infection of blood-borne diseases, especially HIV, when taking or handling blood samples.*



**Figure 6.2** Important veins of the cubital fossa (right arm)



**Figure 6.3** Applying a tourniquet to find a vein

## Teaching content

Teaching should cover the following points:

1. Understanding the reasons for specific blood tests.
2. The importance of taking blood samples for grouping/cross-matching in very ill women when setting up an intravenous infusion.
3. Preparation of all equipment, including:
  - syringe, needles and test tubes for transport of specimens
  - correct laboratory request forms accurately completed
  - tourniquet (otherwise ask assistant to compress under arm).
4. Comfortable position of the woman with arm extended and supported.
5. Explain to the woman what you are doing.
6. In applying a tourniquet, stress:
  - placing of tourniquet at mid-biceps level well above the elbow joint (as in **Figure 6.3**)
  - correct pressure to compress blood vessels and restrict circulation without causing excessive pressure and pinching the skin.



7. Correct site for venepuncture.
8. Sterile technique: cleaning the site before puncturing the skin, use of sterile needle.
9. Precautions against injuries: using gloves if the woman is in a high risk category (e.g. hepatitis, HIV infection).

### Assessing competence

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Is the student able to obtain a blood specimen without causing unnecessary trauma?*
2. *Is the student's technique carried out according to priorities?*
3. *Does the student protect the woman, herself/himself and any assistant(s) from infection? Is she/he careful to avoid needlestick injuries?*
4. *Does the student select appropriate test tube(s) to transport the specimens to the laboratory and send them without delay with the correct request forms?*
5. *Does the student record the tests taken?*
6. *Does the student recognize the limitation of her/his own skill and request assistance when needed?*
7. *Does the student dispose of used syringes and needles safely?*

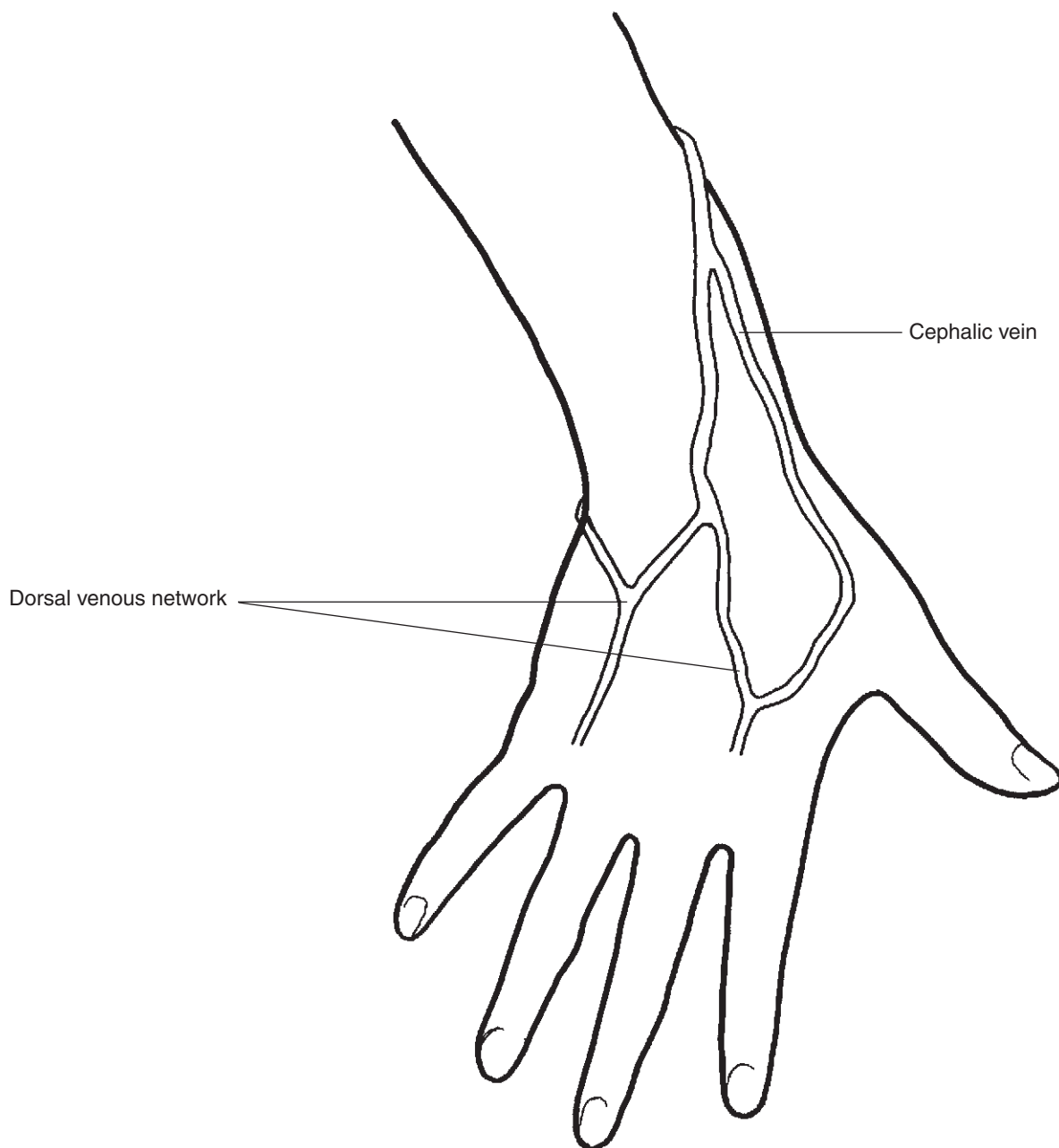
### SKILL: SET UP AND MONITOR INTRAVENOUS INFUSION

#### Teaching method

*Students should be familiar with the anatomical location of the veins of the forearm which are used for IV infusion. Avoid using veins near a joint. The forearm or back of the hand are best (Figure 6.2 and Figure 6.4).*

*Encourage students to trace the course of the veins on their own arms. This is made easier if pressure is applied to the upper arm to constrict the circulation while the arm is extended (as in Figure 6.3).*

*It is essential to demonstrate the technique. It is helpful to ask the student to assist by compressing the arm above the infusion site when setting up the IVI. Describe carefully what you are doing. It is best to help students learn this skill in the first place in a clinical situation where there is no urgency.*



**Figure 6.4** Important veins of the forearm and back of hand

### Teaching content

Suitable fluids that can be used:

- Normal saline and Ringer's lactate are effective replacement fluids and one of these fluids should be used for intravenous infusions, unless the doctor prescribes blood products or a blood transfusion

- Only normal and balanced salt solutions such as Ringer's lactate have a similar concentration of sodium to plasma, and it is this which makes them effective replacement fluids
- Health facilities where intravenous infusions (IVI) may be set up, should have these replacement fluids.

*Teaching should cover the following points:*

1. Identifying the need for IVI.

Replacement fluids are used to increase the volume of fluid in the circulation. Indications are:

- for hypovolaemia, i.e. reduced volume of circulating fluid which may be caused by heavy bleeding
- in cases of severe infection, dehydration or shock.

In addition, IVI may be required for:

- the administration of some IV drugs.

2. Preparation of all equipment, including:

- sterile intravenous tubing
- selection of a large (No. 18) needle or cannula
- selection of appropriate fluid
- running IVI fluid through the tubing to make sure there is no air in the tubing
- sticky tape, already cut into strips
- drip stand or appropriate fixture on the wall (a nail into the wall will suffice)
- rubber tourniquet
- armboard with bandage if woman is restless or unconscious
- clean swabs for cleaning the site of the IVI
- gloves.

3. Ensure the woman understands why she needs to have an IVI inserted, and explain the procedure to her and her companion, if accompanied. Make sure she is in a comfortable position: the woman's arm should be extended and supported.

4. Correct site of the infusion: veins are usually easiest to see on the back of the hand and forearm. Do not use a vein that crosses a joint, as a needle placed there will move every time the joint moves and may come out.

5. Clean technique: wash your hands with soap and water, clean the skin at the site of infusion with clean swabs (use gloves to protect yourself against injuries or transmissible infectious diseases e.g. hepatitis, HIV infection).

6. If the midwife does not succeed putting up an IVI after two, or at the most, three attempts, she should call a more experienced colleague to assist.
7. Fix the IVI firmly on completion with strips of sticky tape. Use an armboard to keep the joint nearest the vein from moving.
8. If the woman is in shock, run in 1 litre of normal saline or Ringer's lactate in about 15 minutes.
9. Keep accurate record of fluids infused and all other intake and output.
10. Monitor vital signs, urinary output and any blood loss.
11. Complications of intravenous infusions:
  - **Local problems:**  
Thrombophlebitis (infection of the vein) and swelling at the injection area (due to leakage of fluids into the tissues). If these problems occur, the needle should be removed and the intravenous infusion restarted in another vein.
  - **Generalized problems:**  
Septicaemia (infection of the blood): this can be prevented by using sterile needles, tubing and intravenous fluids and ensuring a good aseptic technique.  
  
Circulatory overload: giving too much intravenous fluid too fast can cause heart failure and the lungs may fill up with fluids. This can occur when large amounts of IV fluids are infused quickly and in cases of septic shock, because there may be renal damage. Therefore urinary output is diminished and there may be circulatory overload. In these cases, women should be watched carefully for the development of breathing problems and swelling of the face, especially around the eyes.
12. To infuse fluids at an appropriate rate the following points have to be considered:
  - the amount of fluid to be given
  - the time period over which the fluid is given
  - the type of tubing and drop size. Each type of tubing has a slightly different drop size. For example, some tubing has 20 drops per cc, while another type may have only 10 drops per cc.

Table 2 shows how many drops per minute should be administered in order to give a certain amount of fluid over a fixed period of time. To use the table, it is necessary to know the number of drops per cc, which will depend on the type of tubing used.

**Table 2: IV Fluid Rates**

Amount of fluid	Time period	Drops per cc (type of tubing)	Drops per minute
1 litre	20 minutes	10	Too fast to count
1 litre	20 minutes	20	Too fast to count
1 litre	4 hours	10	40
1 litre	4 hours	20	80
1 litre	6 hours	10	28
1 litre	6 hours	20	56
1 litre	8 hours	10	20
1 litre	8 hours	20	40

In general, the formula to figure out any IV infusion rate is as follows:

$$\frac{\text{Amount of fluid given (cc)}}{\text{Time for infusion to occur (minutes)}} \times \text{No. of drops per cc} = \text{No. of drops per minute}$$

In order to convert the time period from hours to minutes, multiply the number of hours by 60. This will give the number of minutes over which the IV fluids are to be given.

## Assessing competence

*In order to confirm that a student is competent, the answer to these questions must be yes.*

- 1. Is the student able to set up an IVI, selecting the site accurately and inserting the needle/cannula without causing unnecessary trauma?*
- 2. Is the student's technique carried out according to priorities?*
- 3. Does the student protect the woman, him/herself and any assistant(s) from infection?*
- 4. Does the student select an appropriate IVI fluid and give an adequate amount at the correct speed?*
- 5. Does the student monitor the patient's condition, knowing the signs that indicate improvement and deterioration?*
- 6. Does the student explain the procedure to the woman?*
- 7. Does the student keep appropriate records?*
- 8. Does the student recognize the limitation of her/his own skill and send for help when needed?*

## SKILL: MAINTAINING FLUID BALANCE

### Teaching method

*Introduce the subject in the classroom and follow this with clinical teaching.*

*For clinical teaching, take the students to the wards and clinically examine women. If you have no ill women in the maternity ward, it would be useful to go into a general ward to teach students about signs of dehydration.*

*Clinical examination of the woman should be followed by checking her charts/records.*

*It is not good practice to make decisions by only looking at the charts. The mother should always be asked how she feels, and should also be examined.*

*Discuss with students:*

- *whether the clinical examination of the woman shows that she is well hydrated or dehydrated*
- *whether the charts are kept correctly*
- *whether the charts show an adequate fluid intake and urinary output.*

### Teaching content

#### Hydration and dehydration

It is essential to have sufficient fluids to maintain life and health. What is sufficient will depend on:

- the climate
- the severity of the fever
- the state of hydration of the woman at the onset of the problem.

The output of fluids should be equivalent to the intake. Fluid is lost from the body through:

- skin
- expired air
- faeces
- urine.

There is normally a marked diuresis in the first few days following delivery. This means that the woman passes a lot more urine at this time. This gets rid of the extra fluid retained in the body during pregnancy.

In a tropical climate, the body maintains its normal temperature by increasing fluid lost through the skin (sweating). This is obvious in

humid climates because the skin remains wet. In dry climates the moisture quickly evaporates and may not be noticed, but fluid is still lost in this way.

A postpartum woman with a fever loses more water than normal through the skin, and therefore needs more fluids than normal. Fluids will also help to reduce the fever.

A woman who is well hydrated should have:

- skin that is elastic and not dry (gently pinching the skin should leave no mark)
- a moist mouth
- a good output of urine.

Signs of dehydration are:

- the woman is thirsty
- her mouth is dry
- her eyes are sunken
- her skin is dry and when pinched, usually on the forearm, it goes back slowly
- her urinary output is low (less than 200 ml per 4 hours)
- her urine is concentrated (dark colour).

Fluids can be given by mouth or intravenously. Fluids must be given intravenously when a woman is in shock (low blood pressure, fast weak pulse) or develops a complication such as severe puerperal sepsis, postpartum haemorrhage, eclampsia or obstructed labour. If given intravenously, give 1 litre of fluid over 3 hours.

*Have available the fluid balance charts which are normally used and make sure that students understand how to use them.*

## **Assessing competence**

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Does the student understand the importance of giving plenty of fluids to a woman with a fever?*
2. *Does the student recognize whether a woman is taking sufficient fluid?*
3. *Can the student recognize signs of dehydration?*
4. *Can the student maintain a fluid balance chart?*
5. *Does the student provide the woman with adequate fluids to drink?*
6. *Does the student make sure that drinking water is clean and safe?*

7. *Does the student actively encourage the woman to drink?*
8. *Does the student know when a woman needs intravenous fluids?*

*This skill should be linked with the basic skill of setting up and monitoring an intravenous infusion.*

## **SKILL: ADMINISTERING NECESSARY DRUGS**

### **Teaching method**

*Introduce the subject in the classroom and follow this with clinical teaching which includes:*

- *ordering and storage of drugs*
- *demonstration and supervision of inserting an intravenous cannula*
- *demonstration of IV administration of a drug*
- *supervision of student giving IV antibiotic (or other drug according to need in clinical practice).*

### **Teaching content**

*Students should know the names, uses, doses and side-effects of analgesics, antipyretics and antibiotic drugs used in the management of puerperal sepsis.*

*Students should be familiar with the drugs that are available for use in the areas where they work.*

### **Giving antibiotics**

It is important to observe some general rules.

1. Use a combination of broad spectrum antibiotics. These are effective against a wide range of bacteria, e.g. aerobic and anaerobic cocci and bacteria, as initially you may not know which microorganisms you are dealing with.
2. Give large doses (as many of the bacteria are not sensitive to antibiotics).
3. IV administration of antibiotics is preferred for serious infections because it helps to speed delivery of the drug to the affected tissues. When IV administration is not possible, IM administration of the antibiotics is acceptable. Giving antibiotics by mouth is acceptable if IV or IM antibiotics are not available and the woman is not in shock; if the infection is minor; or to prevent an infection that has not yet developed.
4. Before starting the antibiotics, take specimens for culture and sensitivities if laboratory facilities are easily available.
5. If the woman does not respond to a combination of antibiotics, as recommended in this module, referral to a doctor is essential for reassessment and further treatment.



## Prescribing drugs

The following points are relevant to the use of all drugs by midwives.

1. If midwives are practicing without the constant supervision of a doctor, specific drugs and doses should be agreed with the responsible medical officer.

If there are legal/medical/midwifery/nursing regulations which prevent midwives from giving drugs in the absence of a doctor, the situation needs to be reviewed.

2. Make sure that there is an adequate supply of necessary drugs available at all times.
3. Make sure that the expiry date of the drugs has not passed, that they are stored safely and at the appropriate temperature.
4. Write clearly on the prescription sheet:
  - Name of drug:
  - Dose:
  - Route of administration:
  - Date and time each dose is given:
  - Signatures: practitioner prescribing and practitioner administering dose.

Remember to give:

- the correct dose
- of the correct drug
- at the correct time
- by the correct route
- to the correct patient.

Whenever possible, it is good practice to ask a second practitioner to check a drug before being administered.

## Intravenous drugs

Midwives should also learn a number of rules about intravenous administration of antibiotics.

1. Midwives must be skilled in the administration of IV injections.
2. The antibiotic may be given through an indwelling cannula which has been inserted into a vein.
3. It is extremely important to make sure that:
  - syringes and needles/cannulae are sterile
  - there is no air in the syringe

- the cannula is patent (i.e. not blocked)
  - the cannula is properly inserted in the vein.
4. Observe the woman very carefully for any adverse reaction to the injection. If this occurs, no further doses should be given and the woman should be referred to the doctor immediately.

### Assessing competence

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Is the student able to select the appropriate combination of antibiotics for use?*
2. *Does the student know the correct doses of all the drugs she/he needs to use, whether IV, IM or oral?*
3. *Is the student able to recognize the need for antipyretics and analgesics? Does she/he use these along with other methods of reducing temperature and relieving pain?*
4. *Does the student know the side-effects of any drugs which she/he administers?*
5. *Does the student understand the importance of noting the expiry date of drugs, and not using them beyond that date?*
6. *Does the student understand the importance of storing drugs properly and of keeping adequate stocks of drugs?*
7. *Can the student demonstrate her/his understanding of the importance of giving:*
  - *the correct dose*
  - *of the correct drug*
  - *at the correct time*
  - *by the correct route*
  - *to the correct woman?*
8. *Does the student administer the drug carefully, accurately and safely?*
9. *Does the student keep accurate and complete records?*

### SKILL: VULVAL HYGIENE AND COMFORT

#### Teaching method

*It is advisable to teach this in the clinical area, emphasizing important points as you teach. Follow this with discussion.*

*Students must be able to*

- *give a vulval wash*
- *maintain vulval hygiene*
- *treat a perineal wound*
- *provide relief for perineal pain.*

## Teaching content

Midwives should keep up to date with research which may change midwifery practice. The following recommendations are made to promote vulval hygiene and comfort in a woman with puerperal sepsis.

1. Individual postpartum care given by a midwife who is gentle and caring is likely to reduce pain and promote recovery.
2. Simple analgesics should be given if requested by the woman. These should not contain codeine because it causes constipation. Constipation will make perineal pain worse.
3. Vulval and perineal washes should be carried out at least twice a day and, for women confined to bed, always after a bowel action. More frequent washes may be required for women with a profuse, offensive discharge. Clean warm water, a clean cloth (which should then be disposed of) and clean soap should be used.
4. Clean pads should be applied to the vulva after each wash and they should be changed between washes, as required.
5. Equipment used for vulval and perineal care should **not** be used for any other woman because of the risk of cross-infection. This includes a bowl for holding the water, cloths and soap.
6. Soiled pads and dressings should be placed in a separate container, and if possible disposed of safely by incineration.
7. The student should observe the character and amount of the vaginal discharge, and the condition of the vulva and perineum and record these observations in the case notes after the treatment.
8. As soon as the woman is ambulant, she should be encouraged to use a shower or bath, provided that there are isolation facilities which are only used by her because of the risk of cross-infection.
9. Before discharge, the woman should be given health education about the importance of good vulval and perineal hygiene.

## Perineal wound

The perineum should be observed for cleanliness, healing and any signs of haematoma. Sutures which are non-absorbable may need to

be removed if there is infection and the wound has not healed after the first few days.

## Assessing competence

*In order to confirm that a student is competent the answer to these questions must be yes.*

- 1. Does the student understand the need to maintain vulval hygiene and perineal comfort?*
- 2. Can the student carry out a vulval and perineal wash, giving the woman comfort and ensuring privacy?*
- 3. Does the student ensure that the perineum is kept clean and dry, and that the woman has adequate clean pads or dressings?*
- 4. Does the student accurately observe the character and amount of the vaginal discharge and the condition of the vulva and perineum; recognise and correctly interpret abnormal findings; and take prompt and appropriate action?*
- 5. Does the student take steps to avoid cross-infection to patients and staff?*
- 6. Does the student make sure that the woman is clean and comfortable before leaving the bedside? (This includes providing a suitable analgesic if needed. The analgesic should not contain codeine).*

## SKILL: PREVENTING THROMBOEMBOLIC DISORDER

### Teaching method

*It is ideal to do most of this teaching at the bedside. Then discuss the relevant physiological changes during pregnancy and the puerperium. These are the increased clotting tendency of the blood and increased venous stasis which is caused by the action of progesterone on the walls of the blood vessels.*

### Teaching content

*Students may be familiar with thromboembolic disorder from their general nursing, but they need to recognize the added risks to the woman who has recently delivered.*

*Students should be familiar with definitions and risk factors.*

### Definitions

- **Thrombosis:** a blood clot in a blood vessel
- **Embolus:** a foreign body (usually a clot of blood or amniotic fluid) which moves and blocks a blood vessel
- **Embolism:** the sudden blocking of a blood vessel by an embolus
- **Pulmonary embolism:** the pulmonary circulation (i.e. the circulation to the lungs) is blocked by an embolus.

## Risk factors

These include:

- age over 35 years
- high parity
- obesity
- caesarean section
- trauma to legs (consider use of lithotomy poles)
- lying in bed
- dehydration
- smoking
- history of oestrogen intake (e.g. oral contraceptives).

## Symptoms and signs

For the symptoms and signs of thromboembolic disorder, see Checklist D in Session 3 of this module.

Pulmonary embolism is a very dangerous problem that can cause maternal death. Everything possible must be done to prevent this complication.

The woman will be at increased risk of emboli when she is ill. This is because of her need to rest in bed and the increased risk of dehydration which accompanies fever.

## Prevention

Prevention of thromboembolic disorder is by active and passive movement.

Active movement is when the woman moves herself.

Passive movement is when the woman is moved by the nurse or midwife because she is unable to move herself.

The use of elastic support stockings may also help to reduce the incidence of thromboembolic disorders, especially for women confined to bed.

It is the responsibility of midwifery personnel to encourage active movement and provide passive movement. During the acute phase of illness, passive movement should involve changing the position of the woman at regular intervals. As her condition improves, passive movement of the limbs should be carried out at regular intervals.

## Assessing competence

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Does the student understand the risks of thromboembolic disorder to a postnatal mother?*
2. *Does the student understand the increased risk when the woman is ill and confined to bed?*

3. *Does the student understand her/his responsibility in preventing thromboembolic disorder?*
4. *Does the student encourage the woman to move in bed and to get up as soon as possible?*
5. *Where necessary, does the student frequently carry out gentle, passive exercise of the limbs?*
6. *Can the student describe the symptoms and signs of deep vein thrombosis, and superficial thrombophlebitis?*
7. *Can the student carry out an examination of the woman in order to detect risk factors?*
8. *Can the student carry out an examination of the woman in order to detect early signs of deep vein thrombosis?*
9. *Can the student explain the dangers of pulmonary embolism?*
10. *Does the student understand that preventing deep vein thrombosis can help to prevent pulmonary embolism?*

## **SKILL: PROVIDING NOURISHING FOOD**

### **Teaching method**

*It is best to do most of this teaching at the bedside.*

*It is also important to work with the woman's relatives or hospital catering staff to help them adapt or increase their skill in preparing healthy, easily digestible and attractive food. Advise students on ways in which they can help other people to do their best, without causing offence.*

*Role play may be helpful here. It can be difficult for young health care professionals to advise older relatives and/or kitchen staff, about cookery.*

*For example:*

*Mrs A has a high fever and no appetite. She is a vegetarian. The hospital cook says: "My food is very good. Everybody who eats my food gets well!" How will you help the cook to make the right kind of food for Mrs A?*

*Think of other situations that focus on local problems.*

*Where there is a shortage of nourishing food, students should discuss ways of helping women and their families cope with the situation.*

## Teaching content

*The principles of providing nourishing food are part of general nursing. Midwifery personnel need to recognize the special needs of the woman who has recently delivered and is ill due to sepsis.*

## Food requirements

A postnatal woman's food should include enough:

- protein
- carbohydrate
- fats
- roughage
- vitamins and minerals.

Midwives should be familiar with local foods that contain these.

Good food is essential during the postnatal period in order to:

- enable the body to recover from giving birth
- provide milk for the baby
- fight infection
- recover from fever.

Vitamins and iron are very important dietary supplements.

## Planning a meal

When advising people how to plan a meal for a woman who has just delivered, the midwife should make sure that the meal contains:

- local staple food such as rice, millet, corn, etc. (provides most of the needed energy and protein and some vitamins)
- legumes such as dry beans and peas, and/or animal foods such as meat, fish, milk and eggs (provide complete protein, iron, calcium and other minerals and vitamins)
- energy-rich foods such as fatty foods (e.g. oil) or sugar
- vegetables, especially dark green leaves and orange vegetables (provide vitamin A, folate, fibre)
- fruits, especially citrus fruits such as oranges (provide vitamins A and C and fibre)
- flavouring foods (salt, onions, pepper).

When fruit is eaten with or immediately after a meal, the vitamin C increases the absorption of iron from the meal.

## Discussion

- *Which foods does the woman need?*
- *Who can get them?*
- *Who can prepare them?*
- *How can we make food easily digestible?*
- *How do we make food look appetizing when prepared?*

Relatives or hospital staff may need help and advice about the availability and preparation of food.

Ask students to form small groups. Each group should:

- prepare a nourishing meal for a sick woman,
- serve the meal in a way that will encourage the woman to eat.

*It could be interesting and helpful to ask the hospital cook or some local women to judge the students' efforts. This could prove a helpful way of sharing knowledge. It will also show respect and recognize the skills these people already have.*

## **Assessing competence**

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Can the student explain the importance of nourishing food in helping a sick mother to recover? Can she/he explain this to the woman and her family?*
2. *Can the student explain the importance of giving extra vitamins and iron? Does she/he make sure that the woman is getting these?*
3. *Can the student plan meals for one full day for a sick woman?*
4. *Can the student discuss this with a hospital cook or relative (as appropriate)?*
5. *Does the student make sure that the woman receives food which is nourishing and acceptable to her?*
6. *Can the student serve (or cause to be served) food which looks appetizing to the woman? This will encourage the woman to eat.*
7. *Does the student make sure that the woman can reach the food provided for her?*
8. *Does the student help the woman to feed herself if necessary?*
9. *Does the student keep appropriate records about the woman's diet?*

## **SKILL: ARRANGING ISOLATION AND BARRIER MIDWIFERY CARE**

### **Teaching method**

The teacher may wish to review the students' basic understanding in the classroom. It may be helpful to recall some of the knowledge learned in Session 1 of this module.

### **Teaching content**

*The students may be familiar with the principles of isolation and barrier midwifery care from their general nursing. However, they need to recognize the special needs of the woman who has recently delivered.*



*Review the relevant information from Sessions 1 and 2. Make sure students understand why a woman with a fever is a risk to other newly delivered women and babies.*

*At this point, review the following information which was included in Session 4.*

The aim of barrier midwifery care and isolation is to prevent the spread of infection to other women and their babies.

Basic nursing principles are important. Midwives/nurses should:

- care for the woman in a separate room or, if that is not possible, in a corner of the ward, away from other patients
- always use a gown and gloves when attending to the woman, and **do not** use them for any other women
- keep one set of equipment, dishes and other utensils exclusively for the use of this woman and make sure it is not used by anyone else
- ensure that soiled linen is sent in a separate bag to the laundry for special treatment, and dressings are collected in a separate container and disposed of safely by incineration
- wash hands very carefully before, and after, attending to this woman.

Where possible a midwife/nurse should be allocated to care specifically for this mother and her baby. It may also be helpful to have a relative assist with their care. If so, the relative must be instructed in the basic principles of preventing the spread of infection. Otherwise visitors should be limited.

## **Assessing competence**

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Does the student understand how cross-infection can occur?*
2. *Can the student explain why the newly delivered woman and her baby are at risk of infection?*
3. *Can the student explain the principles of isolation and barrier midwifery care?*
4. *Can the student demonstrate barrier midwifery care? Here she/he must show how to prevent the transfer of infection to other women and babies. The student should use, for example, separate nursing gown/gloves and separate equipment (including tray, dishes, bedpans, bowls and washing utensils).*
5. *Does the student take care in disposing of waste so that there is no further spread of infection? This must include disposal of pads and dressings.*

6. *Does the student take care of soiled linen correctly?*
7. *Does the student restrict visiting to those relatives who are helping to provide care for the mother?*
8. *Can the student explain the importance of allocating the specific care of this woman to one midwife, if possible?*

## **SKILL: MAINTAINING RECORDS**

### **Teaching method**

*Introduce or revise this topic in the classroom, and then do some clinical teaching with small groups.*

*Ask students to share their own records in the small groups.*

*Help them identify problems and shortcomings in their record keeping.*

*Make sure that students learn to criticize their own records before criticizing those of others. Remind them that they will not help others to improve their record keeping if they make them feel threatened.*

### **Teaching content**

*The students may be familiar with the principles of maintaining records from their general nursing. However, they need to recognize the special requirements of record keeping in midwifery and the particular needs of the woman who has recently delivered.*

*Remind students about the importance of record keeping. Stress that it must be:*

- clear
- legible
- accurate.

*and must include:*

- dates
- times
- signatures.

*Discuss the importance of balance in record keeping. A midwife should write:*

- enough to give a clear and accurate account which includes all the relevant information
- not too much that takes up valuable time when the midwife needs to care for the woman.

***This is very important.***

**Ask the students to form discussion groups and consider the following question “What is the purpose of record keeping?”**

## **Feedback**

*While the students are getting into their groups, write down on the blackboard “What is the purpose of record keeping?”*

*Purposes of record keeping.*

1. To review progress, or lack of progress.
2. To enable appropriate care to be given at the right time.
3. To assist safe continuation of care between different staff.
4. To provide a record for future reference.
5. To meet statutory requirements. *(Here refer to midwifery/nursing rules and regulations regarding record keeping. Read out the relevant section and make sure students understand it. Do this by asking them to translate it into simple English or into another language with which they are familiar).*

## **Assessing competence**

*In order to confirm that a student is competent, the answer to these questions must be yes.*

1. *Does the student understand the principles and purpose of record keeping?*
2. *Are the student’s own records easy to understand and use? Are they clear, legible and the right length?*
3. *Can the student explain the legal/statutory requirements which refer to record keeping by midwives?*

# 6

## CASE STUDIES

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## SESSION 6

### CASE STUDIES

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#### Aims

- To enable students to reflect on practice and realize the important link between process and outcome in respect of preventing and managing puerperal sepsis.
- To enable students to learn from their experience and to make practical recommendations which will improve the outcome when managing puerperal sepsis.

#### Objectives

On completion of Session 6, students will be able to:

- Present a case study and discuss the important questions relating to it.
- Identify the process which led to the outcome of the cases studied, emphasizing the important points of practice in the prevention and management of puerperal sepsis.
- Discuss how other women may also benefit from good care which contributes to a safe outcome or from lessons learned from a poor outcome.
- Describe how improved maternity care can influence the outcome of management of puerperal sepsis, giving examples from experience.
- Explain the importance of reflecting on practice in order to evaluate and improve care.

#### Plan

Case studies, discussion, group work, feedback (3 hours).

Optional tutorials (1 hour per student or small group of students).

#### Resources

Instructions for Students: guidelines for case study.

Instructions for Group Work.

## INTRODUCTION

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*If the students are inexperienced, it would be wise to arrange individual or small group tutorials to explain how to do a case study. Use records from the clinical area. These tutorials will need to take place before this session, and after some clinical teaching.*

*Divide the students into small groups: each group will prepare and present one case study. Give the students the Guidelines for Case Study. To obtain the needed information students should use case records which the teacher has selected from the clinical area.*

*Three case studies have been suggested for this session. The teacher may decide to use just two as part of a shorter session, and repeat the session later using the third case study.*

*If possible it would be appropriate to use at least one case where the outcome was good, and another where the outcome was not so good. It is very important to discuss the reasons for the different outcomes.*

*It is the responsibility of the teacher to ensure the environment is suitably prepared for presenting the case studies.*

## OUTLINE OF THE SESSION

1. *Introduction to the session. Remind students:*
  - *of what has previously been learned through case studies*
  - *that it is important to reflect on practice and learn from experience*
  - *that there is a relationship between process and outcome and that we must influence both of these in order to make pregnancy safer.*

*Introduce the students who will present case studies.*

2. *Presentation of case study 1.*
3. *Opportunity for question and answer about case study 1.*
4. *Presentation of case study 2.*
5. *Opportunity for question and answer about case study 2.*

6. *Presentation of case study 3.*
7. *Opportunity for question and answer about case study 3.*
8. *Summary of case presentations. Here it is very important:*
  - *to link process with outcome*
  - *for students to realize that they can influence this link.*
9. *Give credit to the students who have presented the case studies. This is especially important if they have demonstrated an ability to:*
  - *reflect on their own practice*
  - *make constructive criticism of others.*

*This will help them to develop as safe practitioners.*

10. *Discuss:*

- *how more women may benefit from care which contributed to a safe outcome*
- *if the woman died, what were the avoidable factors.*

*Criticizing your own practice can be an excellent way of setting an example to your students. Make it a positive discussion from which everyone can benefit.*

11. *The review of a case where a woman has suffered from puerperal sepsis will have raised questions on the quality of care provided. These need to be discussed further. Divide the students into groups for group work. Give them the Instructions for Group Work and assign either Section A or B, plus Section C, to each group for discussion.*

## **Feedback**

*At the end of the session you should have a list of points about good practice. Emphasize that these are important in saving lives and therefore in making pregnancy safer. Discuss how good practice can be further developed/encouraged and how bad practice can be avoided.*

*The class should also have put forward recommendations about practice that needs to be improved. These recommendations should address the following questions:*

- *WHAT needs to happen?*
- *HOW can it happen?*
- *WHO will take responsibility?*
- *WHO will help?*

- *WHERE* will the action take place?
- *WHEN* will the action take place?
- *WHEN* will it be evaluated.

## HOW TO END THIS MODULE

*Ask each student to write down one thing they have learned from this module which has already changed their practice. It may be something small, but small things can be very important.*

*Emphasize that every midwife who continues to learn and can apply that learning to her/his practice, helps to make pregnancy safer.*

*Finally, ask each student to write down one thing about her/his practice which she/he intends to change in order to further promote safe motherhood.*

*Students may wish to share some of the changes they have already made and those they intend to make. Invite them to do so, but do not try to force them.*



## INSTRUCTIONS FOR GROUP WORK

Discuss either Section A or B (your teacher will advise you which section to choose), plus Section C.

Ensure confidentiality of the people involved, including the patient and staff.

Discussion of case studies on the Management of puerperal sepsis, using your notes based on the attached guidelines for case study.

### A. In cases where the woman survived:

1. Which actions saved the woman's life?
2. What made these actions possible?
3. Were there any points in the management or clinical situation that could be improved in order to reduce the risk for another woman?

### B. In cases where the woman died:

1. What was the cause of death, and what factors predisposed to it?
2. What were the problems in giving life saving management?
3. What needs to be done in order to avoid these problems in the future?

### C. Reflecting on practice:

1. List any facts about practice which you have learned through these case studies.
2. Make recommendations which you think will help to make the management of puerperal sepsis safer in your practice area.

Appoint a person to report back.

## INSTRUCTIONS FOR STUDENTS – guidelines for case study

Your case study must concern some aspect of management of puerperal sepsis. It should include the following:

**Case number:**

(This will enable the case record to be traced if needed but will protect the confidentiality of the woman).

Age:	
Parity:	
Date of the first day of the last menstrual period (LMP):	
Estimated date of delivery (EDD):	
Social background:	
Past obstetric history:	
Relevant medical and surgical history:	
History and course of present pregnancy, labour and puerperium:	

### SUMMARY OF CARE AND MANAGEMENT TO DATE

You will be required to discuss the following important issues.

1. What happened? This will include details of the sepsis and the condition of the woman on discharge.	This is the outcome
2. What risk factors for puerperal sepsis were present (e.g. prolonged rupture of membranes, frequent vaginal examinations, interference, or other risk)?	This is the process
3. How were pregnancy, labour and postnatal care managed?	
4. Summarize the main points of midwifery practice, emphasizing how the case was managed.	This considers the relationship between process and outcome
5. Were any opportunities missed? Factors may have been overlooked which, in another woman, would have resulted in maternal death. In cases of death, ask: Was this avoidable?	This demonstrates what can be learned through experience



## GLOSSARY

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As this is a combined glossary for all six modules, the terms below may not necessarily be found in this module.

### A

#### Abortion

The term refers to the termination of pregnancy from whatever cause before the foetus is capable of extrauterine life.

**Complete abortion** is the expulsion from the uterus of all the products of conception, which is more likely to occur before the eighth week of pregnancy.

**Incomplete abortion** is the partial expulsion of the products of conception. All or part of the placenta may be retained resulting in profuse bleeding. Usually occurs in the second trimester of pregnancy. Women who seek emergency treatment for complications of abortion, whether they have had a spontaneous or induced abortion, are most often diagnosed with incomplete abortion.

**Induced abortion** refers to the termination of pregnancy through deliberate interference to end the pregnancy. Induced abortion may take place in a safe health care setting and in accordance with the law and health policy guidelines or it may occur outside of the health care system and the provisions of the law.

**Inevitable abortion** involves vaginal bleeding, abdominal cramping and progressive dilation of the cervix, with or without rupture of the membranes. It is impossible for the pregnancy to continue and eventual expulsion of the products of conception will occur.

**Missed abortion** occurs when the fetus dies and is retained in the uterus. The dead conceptus will be expelled eventually, although blood coagulation disorders may develop in cases of missed abortion which persist for more than 6–8 weeks.

#### Septic abortion

An abortion (loss of pregnancy during the first 22 weeks) that is followed by infection of the uterus and may spread throughout the genital tract causing fever and chills, foul-smelling vaginal discharge, pelvic pain and septicaemia. Septic abortion happens most commonly where facilities and standards are poor.

**Spontaneous abortion** refers to terminated pregnancy for which no deliberate steps have been taken to end the pregnancy. Spontaneous abortion, which is sometimes referred to as miscarriage, affects approximately 10–15% of all known or suspected pregnancies.

**Threatened abortion** involves vaginal bleeding with or without cervical dilatation. The symptoms may resolve and a viable pregnancy may continue. If the symptoms continue, the pregnancy will result in an inevitable, complete or incomplete abortion.

**Unsafe abortion** refers to the termination of pregnancy by persons lacking the necessary skills or in an environment lacking the minimal standards of care or both.

<b>Abscess</b>	A localized collection of pus in any part of the body due to infection.
<b>AIDS</b>	Acquired immune deficiency syndrome.
<b>Amnion</b>	The innermost of the membranes enveloping the baby in the uterus and which produces and contains the amniotic fluid.
<b>Amniotic fluid</b>	The fluid produced and contained within the amnion. During the latter half of pregnancy it also contains fluid from the fetal lungs and kidneys. This fluid provides space for unimpeded fetal growth and, in late pregnancy and in labour, it equalizes the pressure exerted by contractions, equalizes the temperature and provides some nutritive substances for the fetus.
<b>Amniotic fluid embolism</b>	This rare but often fatal condition is caused by amniotic fluid entering the maternal circulation via the uterine sinuses of the placental bed. It is most likely to occur in labour or in the immediate postpartum period, following very strong contractions. Symptoms and signs include cyanosis, chest pain, dyspnoea, blood-stained, frothy sputum, convulsions and collapse.
<b>Amniotomy</b>	Surgical rupture of the fetal membranes to induce labour.
<b>Anaemia</b>	A reduction in the number of red blood cells or in the amount of haemoglobin present in them. Anaemia can be caused by excessive blood loss, or by not eating enough foods rich in iron or folic acid. Other causes are excessive breakdown of red cells (e.g. in malaria), or failure to manufacture them
<b>Analgesic</b>	A drug given to relieve pain.
<b>Aneurysm</b>	A sac formed by the dilatation of the wall of an artery.
<b>Anoxia</b>	A state of being deprived of oxygen.
<b>Antepartum</b>	Before delivery.
<b>Antepartum haemorrhage</b>	Bleeding from the genital tract at any time after the 22nd week of pregnancy and before the birth of the baby. There are two main causes of antepartum haemorrhage, placenta praevia and abruptio placentae.
<b>Anterior</b>	Situated in front or directed towards the front.
<b>Antero posterior</b>	From front to back.
<b>Antibiotic</b>	Drugs derived from living microorganisms which destroy or inhibit the growth of pathogenic bacteria. They are given to treat infection.
<b>Antibody</b>	A protein produced in the body to fight microorganisms or foreign substances which may enter the body. In pregnancy, maternal antibodies to specific conditions are transferred across the placenta to the fetus. This gives the baby a passive immunity to some diseases in the first few months of life.

<b>Anticonvulsant drug</b>	A drug which controls convulsions.
<b>Antihypertensive</b>	A drug given to reduce high blood pressure.
<b>Antipyretic</b>	A drug given to reduce fever.
<b>Antiseptic</b>	A substance that prevents infection by killing certain bacteria on skin or body tissues. Antiseptics include surgical spirits, chlorhexidine and iodine.
<b>Anuria</b>	No urine is produced by the kidneys. This life-threatening condition may be associated with obstetric emergencies such as severe haemorrhage, eclampsia and septic shock.
<b>Apex</b>	The top or highest point.
<b>Apnoea</b>	Absence of breathing.
<b>Aseptic technique or asepsis</b>	Aseptic technique refers to special precautions taken to achieve a bacteria-free environment, e.g. at delivery or at surgical operations. Precautions include use of the correct hand-washing technique, correct use of sterile instruments and drapes, the wearing of appropriate clothing by staff, e.g. gown, cap and gloves.
<b>Asphyxia</b>	A condition in which there is a deficiency of oxygen in the blood and an increase in carbon dioxide. If the baby fails to breathe at birth, it suffers from asphyxia and requires urgent resuscitation.
<b>Asymmetrical</b>	Unequal size or shape of two normally similar structures. The pelvis may be asymmetrical if distorted by disease, injury or congenital malformation.
<b>Atonic</b>	Lack of muscle tone.
<b>Atonic postpartum bleeding</b>	Occurs from the placental site because 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 contraction, such as a retained placenta, will predispose to atonic bleeding.
<b>Augment</b>	To increase: in augmented labour, oxytocin may be used to increase the effectiveness of contractions if progress is slow.
<b>Avoidable factors</b>	Factors causing or contributing to maternal death where there is departure from generally accepted standards of care.
<b>Axilla</b>	The armpit.
<b>B</b>	
<b>Bacteria</b>	Microscopic, unicellular organisms which, if pathogenic, can cause disease. They reproduce extremely quickly, thus can rapidly multiply in the body.
<b>Bacteriuria</b>	Presence of bacteria in the urine

<b>Bandl's ring</b>	The area between upper and lower uterine segments when it becomes visible and/or palpable during obstructed labour. It is caused by the extreme thickening of the upper segment and the dangerous thinning of the lower segment and is a sign of impending rupture of the uterus.
<b>Bartholin's glands</b>	Two small mucous-producing glands, one on each side of the vaginal orifice.
<b>Bimanual compression of uterus</b>	A manoeuvre to arrest severe postpartum haemorrhage after delivery of the placenta when the uterus is atonic. The right hand is inserted into the vagina and closed to form a fist which is placed in the anterior vaginal fornix. The left hand is pressed deeply into the abdomen behind the uterus, applying pressure against the posterior wall of the uterus. Pressure is maintained until bleeding is controlled.
<b>Bolus</b>	A dose of a pharmaceutical preparation which is given all at once.
<b>Broad ligament</b>	Two folds of peritoneum draped over the uterus which extend to the side walls of the pelvis and help to keep the uterus in its place. They contain the uterine tubes, parametrium, blood vessels and nerves.
<b>C</b>	
<b>Capsular decidua</b>	The part of the decidua which lies over the developing embryo during the first 12 weeks of pregnancy.
<b>Caput succedaneum</b>	Swelling of the fetal scalp due to pressure from the cervix. The swelling may be exaggerated in obstructed labour.
<b>Cavity</b>	A hollow place or space in the body.
<b>Cephalic presentation</b>	The head (i.e. cephal) lies in the lower pole of the uterus.
<b>Cephalopelvic disproportion</b>	A misfit between the fetal head and the pelvis through which it has to pass. It may be caused by a small or abnormally-shaped pelvis, or a large or abnormal baby.
<b>Cerebral haemorrhage</b>	Bleeding in the brain due to a ruptured blood vessel.
<b>Cerebrospinal fluid</b>	The liquid contained inside the brain and around the spinal cord.
<b>Cervical os</b>	The internal os is the opening between the cervix and the body of the uterus and the external os is the opening between the cervix and the vagina. After effacement of the cervix in labour, there is only os and that lies between the lower segment of the uterus and the vagina.
<b>Chorioamnionitis</b>	Infection of the membranes that envelop the fetus in the uterus.
<b>Chorion</b>	The outermost of the two membranes which envelope the fetus in the uterus.
<b>Chronic</b>	Prolonged or permanent.

<b>Circulatory overload</b>	Overloading the circulation. This may occur in cases of excessive intravenous infusion of fluids. It leads to respiratory problems due to an accumulation of fluid in the lungs and to cardiac failure.
<b>Coagulation</b>	Formation of a blood clot.
<b>Coagulation failure</b>	Disturbance of the coagulation system resulting in widespread formation of clots, mainly in the capillaries. Eventually haemorrhage occurs because all the clotting factors are depleted. These events result in ischaemic damage within the body organs and, unless urgent treatment is instituted, will result in death. It is triggered by certain conditions which introduce coagulation-promoting factors into the circulation, e.g. abruptio-placentae, severe pre-eclampsia and eclampsia, retained dead fetus after several weeks, amniotic fluid embolism and some very severe infections.
<b>Coccyx</b>	The small bone at the end of the sacrum which is formed by four fused vertebrae. It forms a movable joint with the sacrum and moves backwards out of the way during vaginal delivery, thereby increasing the size of the pelvic outlet.
<b>Coma</b>	A state of unconsciousness from which the person cannot be aroused. The person is said to be in a coma or comatose.
<b>Contraction</b> (of pelvis)	Reduction in size.
<b>Cortical necrosis</b>	Death of the outer part of the substance of an organ (e.g. the kidney).
<b>Crepitations</b>	Dry, crackling sound.
<b>Cross-matching</b> (of blood)	A test of the compatibility of donor and recipient blood performed before transfusion.
<b>Crowning</b>	The moment during birth when the widest presenting diameter of the fetal skull distends the vaginal orifice and the head no longer recedes between contractions.
<b>Cubital fossa</b>	The depression in the part of the arm which is in front of the elbow.
<b>Cyanosis</b>	A bluish discolouration of skin and mucous membranes due to lack of tissue oxygenation.
<b>Cystitis</b>	Infection of the urinary bladder.
<b>D</b>	
<b>Decidua</b>	The name given to the endometrium (innermost layer) of the pregnant uterus. The part of the decidua that is underneath the placenta is the decidua basalis. The part that lines the uterus elsewhere than at the site of placental attachment is the decidua vera or parietalis.



<b>Deep vein thrombosis</b>	The formation of a thrombus (clot) in a deep vein, most commonly in the leg or pelvis. It causes swelling and pain when walking. If a clot detaches itself from the wall of the vein it may be carried in the blood-stream to the heart or lungs causing collapse and, unless immediate resuscitation is successful, death.
<b>Deficiency</b>	A lack of.
<b>Deflexed (head)</b>	Erect head, rather than a flexed head with the chin on the chest. occurs in occipito-posterior positions and may cause prolonged labour because larger presenting diameters of the fetal head have to pass through the pelvis.
<b>Deformity</b>	Distortion of any part of the body. Malformation.
<b>Dehydration</b>	Condition caused by excessive loss of body fluid or by an inadequate intake of fluid. Signs of dehydration include dry mouth, thirst, sunken eyes, skin pinch goes back slowly and reduced urinary output.
<b>Delirium</b>	Disordered state of mind with incoherent speech, hallucinations and excitement. Commonly occurs with high fever.
<b>Diameter</b>	A straight line passing through the centre of a circle or sphere. A number of diameters of the pelvis and fetal skull are described and appropriate measurements given.
<b>Differential diagnosis</b>	Deciding which of two or more conditions may be the cause of symptoms and signs noted.
<b>Direct obstetric death</b>	A death resulting from obstetric complications of the pregnant state (i.e. pregnancy, labour and puerperium), from interventions, omissions, incorrect treatment, or a chain of events resulting from any of the above.
<b>Disseminated intravascular coagulation</b>	Disturbance of the coagulation system triggered by certain conditions (e.g. septic or haemorrhagic shock, eclampsia) and characterized by generalized bleeding. (See coagulation failure).
<b>Distended</b>	Stretched.
<b>Distortion</b>	The state of being twisted out of normal shape.
<b>Diuresis</b>	Passing increased amounts of urine.
<b>Diuretic</b>	A drug that is given to increase the production of urine.
<b>Dorsal position</b>	Lying on the back.
<b>Drowsy</b>	Half asleep, dozing.
<b>Dysentery</b>	Infection in the intestines due to bacteria or parasites, causing pain in the abdomen and frequent stools containing blood, pus or mucous.

## E

<b>Eclampsia</b>	A condition peculiar to pregnancy or a newly delivered woman, characterized by fits followed coma. The woman usually has hypertension and proteinuria. The fits may occur in the antepartum, intrapartum or early postpartum periods.
<b>Empathy</b>	Intellectual and emotional awareness and understanding of another person's thoughts, feelings and behaviour, even those that are distressing and disturbing.
<b>Endocarditis</b>	Inflammation of the membrane lining the cavities of the heart.
<b>Endometritis</b>	Infection of the endometrium (inner lining of the uterus).
<b>Endometrium</b>	The innermost layer of the uterus.
<b>Engorged breasts</b>	Painful accumulation of secretion in the breasts, often accompanied by lymphatic and venous stasis and oedema at the onset of lactation. Frequent feeding and ensuring that the baby is correctly positioned at the breast helps to relieve the condition.
<b>Epigastric</b>	The upper middle region of the abdomen.
<b>Episiotomy</b>	A cut made in the perineum just before the head crowns to facilitate delivery. It should not be a routine procedure, but only performed for fetal distress to speed up the birth, before complicated vaginal deliveries, e.g. breech, shoulder dystocia, and for preterm infants to relieve the pressure on their soft skulls, thereby reducing the risk of cerebral injury.
<b>Essential hypertension</b>	High blood pressure occurring without discoverable cause.
<b>Expansile</b>	Capable of stretching.
<b>Extend the knee</b>	To straighten the leg.
<b>Extension (head)</b>	Lengthening. It is the opposite of flexion. Used to describe the mechanism by which the head is born, i.e. after flexion, the head extends to allow the forehead, face and chin to be born.
<b>External</b>	Situated on the outside.
<b>F</b>	
<b>False labour</b>	Painful uterine contractions which are not accompanied by cervical effacement and dilatation. Contractions often irregular and cease spontaneously after a few hours.
<b>Fatal</b>	Ending in death.
<b>Fetal sac</b>	The bag of membranes which envelop the baby in the uterus.
<b>Feto-maternal transfusion</b>	Passage of fetal blood into the blood circulation of the mother, through the placenta.
<b>Fibroids</b>	A benign tumour of the myometrium (muscle of the uterus).

<b>Fistula</b>	An abnormal passage or communication between two organs for example, the urinary bladder and the vagina, i.e. a vesico-vaginal fistula, or the vagina and the rectum, i.e. recto-vaginal fistula. It is a serious complication of obstructed labour and results in urinary or faecal incontinence. Operative repair is usually required.
<b>Flexed</b>	Bent forward.
<b>Flexible</b>	Pliant, i.e. bends easily.
<b>Flexion (head)</b>	Head is bent forward.
<b>Fluctuating</b>	Giving the sensation of wavelike motion on palpation, due to a liquid content (e.g. pus in an abscess).
<b>Foaming</b>	Collection of small bubbles formed in liquid by agitation; froth. Foaming at the mouth: occurs during a fit due to saliva and mucus bubbles.
<b>Fontanelle</b>	A membranous space on the baby's head where two or more sutures meet. Often called the 'soft spots.' The <b>anterior fontanelle</b> is the diamond-shaped membranous space on the front part of the head at the meeting of four suture lines. The <b>posterior fontanelle</b> is the small triangular membranous space on the back part of the head at the meeting of three suture lines.
<b>Fundus</b>	The rounded upper part of the uterus, above the insertion of the fallopian tubes.
<b>G</b>	
<b>Genital mutilation</b>	The traditional surgical practice of cutting away part or all of the external genitalia of a woman. In the most extreme form, called "infibulation", the two sides of the vulva are also stitched together to leave a very small opening.
<b>Genital tract</b>	The pathway formed by the genital organs including the uterine tubes, uterus, cervix, vagina, vulva.
<b>"Gishiri" cut</b>	A traditional practice among the Hausa people of Nigeria whereby the vagina is cut to facilitate delivery when labour is obstructed.
<b>Glycosuria</b>	The presence of glucose (sugar) in the urine.
<b>Grand mal epilepsy</b>	A major epileptic fit followed by loss of consciousness.
<b>Grand multiparity</b>	A woman who has borne five or more children.
<b>Groin</b>	The junctional region between the abdomen and the thigh.
<b>Grouping (of blood)</b>	Determining blood type (A, B, O, AB).
<b>H</b>	
<b>Haematemesis</b>	The vomiting of blood.

<b>Haematocrit</b>	The percentage volume of packed red cells in a blood specimen. This measurement is obtained by centrifugation (spinning very fast) of the specimen. It is a screening test for anaemia.
<b>Haematoma</b>	A localized collection of blood in an organ or tissue due to blood leaking from a blood vessel.
<b>Haemoglobin</b>	The substance in red blood cells which carries oxygen from the lungs to the tissues.
<b>Haemoglobinopathies</b>	Disorders of the blood caused by abnormal forms of haemoglobin (e.g. sickle cell anaemia, thalassaemia). Severe anaemia occurs in these conditions.
<b>Haemolytic anaemia</b>	Anaemia caused by destruction of red blood cells, as in malaria. Haemolytic disease of the newborn may occur as a result of rhesus incompatibility. These babies may require an exchange transfusion after birth.
<b>Haemorrhage</b>	Excessive bleeding from a torn or severed blood vessel. It may occur externally or within the body.
<b>Hemiplegia</b>	Paralysis of one side of the body.
<b>HIV</b>	Human immune deficiency virus.
<b>Hollow</b> (of the sacrum)	The concave anterior surface of the sacrum.
<b>Humerus</b>	The bone that extends from the shoulder to the elbow.
<b>Hydatidiform mole</b>	An abnormal pregnancy resulting in a mass of cysts resembling a bunch of grapes. Termination of pregnancy is required and follow-up is essential because of the risk of chorion carcinoma developing.
<b>Hydration</b>	The absorption of or combination with water.
<b>Hydrocephalus</b>	A condition characterized by accumulation of cerebrospinal fluid within the ventricles of the brain. The baby with hydrocephalus has an enlarged head and a prominent forehead. Severe cases are incompatible with life, but mild cases may be treated by an operation which diverts excess fluid from the brain into the blood stream.
<b>Hyperemesis gravidarum</b>	Excessive vomiting during pregnancy. It is a serious condition which causes dehydration and ketosis and the woman will deteriorate quickly unless appropriate treatment is given. Liver and renal damage may occur leading to coma and death.
<b>Hypertension</b>	High blood pressure.
<b>Hypertonic</b>	Excessive tone. Hypertonic uterine contractions are abnormal and extremely painful, with only a short interval between them. Usually result in fetal distress and may cause rupture of the uterus. Often associated with prolonged and difficult labour, or excessive use of oxytocic drugs to augment or induce labour.
<b>Hyponatraemia</b>	Insufficient sodium (salt) in the blood.

<b>Hypovolaemia</b>	Abnormally low volume of blood circulating in the body. This can happen when the body loses a lot of blood (e.g. in postpartum haemorrhage).
<b>Hypoxia</b>	A diminished oxygen supply to the tissues.
<b>I</b>	
<b>Idiopathic</b>	With no known cause.
<b>Idiopathic thrombocytopenia purpura</b>	Condition of unknown cause characterized by a decrease in the number of blood platelets resulting in inability of the blood to coagulate properly.
<b>Imminent</b>	Soon to happen.
<b>Incision</b>	A surgical cut.
<b>Indirect obstetric death</b>	A death resulting from previous existing disease or 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.
<b>Induced labour</b>	A labour that is started artificially by the use of oxytocic drugs and/or by rupturing the membranes.
<b>Infarct</b>	An area of necrosis (dead tissue) in an organ caused by local ischaemia, (i.e. poor blood supply). Placental infarcts may be seen, especially in cases of hypertension in pregnancy.
<b>Infertility</b>	Difficulty or inability to conceive.
<b>Infiltration</b> (of local anaesthetic)	Method of injecting a local anaesthetic into the tissues. Infiltration of the perineum is carried out before an episiotomy is made.
<b>Internal</b>	On the inside.
<b>Intrapartum</b>	Occurring during childbirth.
<b>Intraperitoneal</b>	Within the peritoneal cavity.
<b>Intrauterine death</b>	Death of the fetus in the uterus.
<b>Intrauterine growth retardation (IUGR)</b>	Poor fetal growth in the uterus. The reason is not always known, but it is more likely in cases of malnutrition, anaemia, pre-eclampsia, malaria, tuberculosis and in women who smoke.
<b>Involution of the uterus</b>	Uterus returning to normal size after delivery. Involution occurs by autolysis, (i.e. breaking down) and ischaemia (i.e. reduced blood supply) of excess muscle fibres. It starts soon after birth and is completed within about six weeks.
<b>Ischial spines</b>	The two small protuberances of the pelvis that project into the pelvic cavity and can be felt laterally upon vaginal examination.

<b>Isthmus</b>	The narrow connection between the body of the uterus and the cervix.
<b>K</b>	
<b>Ketoacidosis</b>	A state of electrolyte imbalance with ketosis and lowered blood pH. It may occur in labour if the woman becomes dehydrated and ketotic. The woman with ketosis has sweet or fruity odour to her breath. Treatment is to rehydrate the woman, giving adequate fluid and carbohydrate.
<b>Ketonuria</b>	The presence of ketone bodies in the urine.
<b>Kyphosis</b>	Abnormally increased convexity in the curvature of the thoracic spine as viewed from the side.
<b>L</b>	
<b>Laparotomy</b>	Incision through the uterine wall to enter the peritoneal cavity.
<b>Lateral</b>	To the side.
<b>Leukopenia</b>	An abnormal decrease in the number of white blood cells which are the cells in the blood which fight infection.
<b>Liquor</b>	Another word for amniotic fluid.
<b>Lithotomy poles</b>	Special poles attached to either side of a delivery bed or theatre table. They have slings which are used to support the woman's legs during certain procedures which are carried out in the genital area, e.g. vacuum extraction, perineal suturing.
<b>Lithotomy position</b>	The woman lies down on her back with legs wide apart and supported by the slings which hang on the lithotomy poles.
<b>Lochia</b>	The discharge from the uterus after childbirth. It consists of blood, mucus, shreds of decidua and other debris from the uterus. During the first 2–3 days it consists mainly of blood, then changes to a pinky/brown colour and contains more serous fluid. Finally it changes to a whitish colour and consists mainly of white blood cells and mucus. The lochia lasts for 2–3 weeks after the birth. Persistent red, profuse lochia may be associated with retained products of conception. Foul-smelling lochia is a sign of infection.
<b>Loin</b>	The part of the back between the thorax and the pelvis.
<b>Lumbar puncture</b>	The procedure whereby a hollow needle is inserted into the subarachnoid space between the third and fourth lumbar vertebrae to obtain a specimen of cerebrospinal fluid for examination, and to measure the pressure within the fluid. It may also be carried out for spinal anaesthesia

# M

<b>Malar bones</b>	The cheek bones.
<b>Malnutrition</b>	Inadequate nourishment resulting from a poor diet or from a defect in metabolism that prevents the body from using its food properly. The symptoms of malnutrition are physical weakness, lethargy and a sense of detachment from reality. In starvation there may be oedema, abdominal distension and excessive loss of weight. In addition there are signs of multiple vitamin deficiency.
<b>Marginal</b>	Borderline.
<b>Mastitis</b>	Infection of the breast. A wedge-shaped area of the breast becomes tender, red and hot and the woman feels generally unwell. The infection responds well to treatment with antibiotics. If untreated, it may lead to breast abscess.
<b>Mastoiditis</b>	Infection of the bone behind the ear. This can be a complication of otitis media (middle ear infection).
<b>Meconium</b>	A dark green material present in the intestines of the full-term fetus. It consists of bile-pigments and salts, mucus, epithelial cells and often some amniotic fluid. It is the first stool passed by the baby and continues for a day or two. Occasionally it is passed in utero when it may be a sign of fetal distress.
<b>Median</b>	Situated in the midline of a body or structure.
<b>Median cubital vein</b>	The vein situated in the midline of the cubital fossa.
<b>Medical audit</b>	Official examination of medical records.
<b>Meningitis</b>	Infection of the membranes enveloping the brain.
<b>Mental retardation</b>	Delayed mental development.
<b>Mento vertical diameter</b>	The distance between the chin and the vertex (highest point) of the head.
<b>Mid-biceps</b>	Halfway down the biceps (the muscle on the inside of the upper arm).
<b>Monoplegia</b>	Paralysis of one limb (arm or leg).
<b>Moulding</b> (of the fetal head)	Overlapping of fetal skull bones at the sutures and fontanelles to allow the bones to adapt to the pelvis through which it is passing. The presenting diameter is decreased and the diameter at right angles increased. If moulding is excessive (e.g. in obstructed labour), in the wrong direction, as occurs in malpositions and malpresentations, or occurs too quickly, there is a danger of intracranial haemorrhage.
<b>Multipara</b>	A woman who has borne more than one viable child.
<b>Multiple pregnancy</b>	A pregnancy of more than one fetus, such as in the case of twins or greater multiples.

**Myometrium** The muscle layer of the uterus.

## N

**Nape** The back of the neck.

**Necrosis** Death of tissues.

**Normal saline** A solution of 0.9% sodium chloride (salt) that may be given in an intravenous infusion.

**Nullipara** A woman who has never borne a viable child.

## O

**Obesity** Excessive fat throughout the body. Weight gain increases beyond that which is considered desirable with regard to age, height and bone structure. In pregnancy the obese woman is at greater risk of complications such as hypertension.

**Oblique** Slanting, inclined, diagonal.

**Obstructed labour** A labour in which progress is arrested by mechanical factors and delivery is impossible without operative intervention.

**Occipito frontal diameter** The distance between the bridge of the nose and the occipital protuberance (i.e. the prominence which can be felt on the occipital bone at the back of the head). It is the presenting diameter when the head is deflexed and measures 11.5 cm.

**Occiput** The area of the head which lies below the posterior fontanelle to the junction with the neck.

**Oedema** An excess of fluid in the tissues of the body. It causes excessive weight gain and swelling which pits on pressure. In pregnancy it is a common feature affecting the feet and ankles, but may also affect the hands, face and become generalized. It is no longer considered a significant sign of pre-eclampsia because some oedema is a common feature in so many pregnancies.

**Offensive** Smelling very bad.

**Oliguria** Diminished secretion of urine. It may be associated with impaired renal function following severe complications such as haemorrhage, pre-eclampsia and eclampsia and septic shock.

**Os** An opening  
A bone.

**Osteomalacia** Adult rickets. It is caused by a gross deficiency of vitamin D which results in painful softening of the bones.

**Otitis media** Infection of the middle ear. Usually happens as a complication of an upper respiratory tract infection. Symptoms include pain in the ear and fever.



<b>Oxygen</b>	A colourless, odourless gas which is essential for life. It constitutes 21% of the atmosphere and is drawn into the lungs during the process of breathing. It then circulates in the blood to oxygenate all the tissues of the body. Lack of oxygen, (hypoxia) causes cyanosis , when the skin and mucous membranes have a bluish colour. Anoxia (no oxygen) causes death and is a common cause of perinatal death.
<b>Oxytocic</b>	Term applied to any drug which stimulates contractions of the uterus in order to induce or accelerate labour, or to prevent or treat postpartum haemorrhage.
<b>P</b>	
<b>Parametritis</b>	Infection of the parametrium.
<b>Parametrium</b>	Connective tissue around the lower part of the uterus. It fills in the spaces between the uterus and related organs.
<b>Parity</b>	The number of viable children a woman has borne.
<b>Partograph</b>	A record of all of the clinical 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, and descent of the head. It includes an alert and action line which, if crossed when recording cervical dilatation, indicates that labour is progressing more slowly than normal and intervention is required.
<b>Patella</b>	The bone situated at the front of the knee, forming the kneecap.
<b>Pathogenic</b>	An agent or microorganism which causes disease, e.g. pathogenic bacteria.
<b>Pelvic brim (or inlet)</b>	The pelvic brim is the first part of the true pelvis to be negotiated by the fetus. As a general rule, if the fetal head can enter the pelvic brim, it should be able to pass through the rest of the pelvis.
<b>Pelvic inflammatory disease (PID)</b>	An infection of the reproductive organs (uterus, fallopian tubes, ovaries, parametrium). The infection may follow delivery or abortion, or it may be secondary to other infections of the genital tract or abdomen, or be a blood borne infection, e.g. tuberculosis. Symptoms include lower abdominal pain, fever, and vaginal discharge. Unless treated early and effectively with antibiotics, the fallopian tubes may be blocked and lead to secondary infertility. The condition may also become chronic.
<b>Pelvic outlet</b>	The diamond-shaped bony outlet of the pelvis through which the fetus passes at birth.
<b>Pericarditis</b>	Inflammation of the sac (pericardium) which surrounds the heart.
<b>Perimetrium</b>	The outermost layer of the uterus. It is draped over the uterus like a sheet and extends to the side walls of the pelvis forming the broad ligaments.
<b>Perinatal</b>	Around the time of birth.

<b>Perineum</b>	The area extending from the pubic arch to the coccyx, with underlying tissues. In obstetrics the perineal body is the fibromuscular pyramid between the lower third of the vagina anteriorly and the ischial spines laterally. In the second stage it thins and stretches during the birth of the baby and, in some cases, is torn.
<b>Peritoneal cavity</b>	The space containing the internal organs of the abdomen.
<b>Peritoneum</b>	Membrane covering the internal organs of the abdomen and lining the abdominal and pelvic cavity.
<b>Peritoneum, parietal</b>	Peritoneum lining the abdominal and pelvic cavity.
<b>Peritoneum, visceral</b>	Peritoneum that covers the abdominal organs, holding them into position.
<b>Peritonitis</b>	Infection of the peritoneum.
<b>Persistent occiput posterior</b>	The fetus has its occiput (i.e. back of head) directed towards the back of the maternal pelvis. Usually the head flexes and rotates to an anterior position, but a persistent occipito-posterior position fails to rotate and the baby is delivered face to pubes. Labour is often more difficult in these cases because wider diameters of the fetal head have to pass through the pelvis, contractions may be less effective, cervical dilatation slower, descent of the fetus delayed and injuries to mother and child are more common.
<b>Photophobia</b>	When light hurts the eyes.
<b>Physical disability</b>	A physical defect which may limit the individual's capacity to participate fully in normal life.
<b>Pivot</b>	To turn or swivel on a central point.
<b>Placenta praevia</b>	An abnormally situated placenta in the lower segment of the uterus which completely or partly covers the os (the opening between the uterus and the cervix). The stretching of the lower segment of the uterus during the last trimester of pregnancy causes some placental separation from the uterine wall. As a result episodes of vaginal bleeding occur which are typically painless. The danger is that the woman will have a catastrophic haemorrhage during late pregnancy.
<b>Placental abruption</b>	Premature separation of a normally-situated placenta, that is a placenta in the upper segment of the uterus, which occurs after the 22nd week. In this case there may be abdominal pain as well as bleeding. If the bleeding is concealed, i.e. collects behind the placenta, the abdomen will feel hard and be very painful. Shock may be severe and fetal distress is common.
<b>Pleurisy</b>	Infection of the membrane covering the lungs and lining the walls of the chest.
<b>Polyhydramnios</b>	A condition characterized by an excess of amniotic fluid. It is associated mainly with multiple pregnancy, fetal abnormality, diabetes and hydrops fetalis, a rare condition caused by severe haemolytic disease.

<b>Polyuria</b>	Excessive urination.
<b>Posterior</b>	Situated at the back of, or in the back part of, a structure.
<b>Postpartum</b>	After labour.
<b>Postpartum haemorrhage</b>	Blood loss of 500 ml or more from the genital tract after delivery. The commonest cause is atony (poor muscle tone) of the uterus, or it may be caused by trauma to the genital tract, e.g. tears of the vagina, cervix, or lower segment of the uterus. Postpartum haemorrhage is the commonest cause of maternal death.
<b>Potency</b>	The power of a medicinal agent to produce its desired effect.
<b>Pouch of Douglas</b>	The pocket like space between the rectum and the uterus.
<b>Pre-eclampsia</b>	A condition specific to pregnancy, arising after the 20th week of gestation, characterized by hypertension and proteinuria. Oedema may also be present, but is no longer considered a cardinal sign because it is present to some extent in most pregnancies. If not controlled, pre-eclampsia will lead to eclampsia which is characterized by fits, followed by coma, and has a high mortality rate.
<b>Pre-term baby</b>	A baby who is born before the 37th completed week of pregnancy.
<b>Precipitate labour</b>	Labour which progresses unusually quickly.
<b>Primary postpartum haemorrhage</b>	Excessive bleeding from the genital tract in the first 24 hours after delivery. The amount of blood is 500 ml or more.
<b>Primigravida</b>	A woman pregnant for the first time.
<b>Primipara</b>	A woman who has borne one viable child.
<b>Prolonged labour</b>	Labour which exceeds 12 hours.
<b>Prolonged rupture of membranes</b>	Ruptured membranes for more than 18 hours, regardless of whether labour has started or not.
<b>Prophylactic</b>	An agent which is used to try and prevent disease.
<b>Prophylactic antibiotic treatment</b>	Giving antibiotics to prevent infection.
<b>Proteinuria</b>	Presence of protein in the urine. Causes are contamination by vaginal discharge, infection or pre-eclampsia. It should always be investigated because, if due to pre-eclampsia, it is a serious sign. If caused by infection, treatment with antibiotics is required.
<b>Pubic arch</b>	The curved bowl-like bony structure which lies at the front of the pelvis.
<b>Puerperal sepsis</b>	An infection of the genital tract at any time between the onset of rupture of membranes or labour and the 42nd day following delivery or abortion.

<b>Puerperium</b>	The 42-day period following delivery of the baby. Another word meaning the same is “postpartum period”.
<b>Pulmonary embolism</b>	The blood circulation in the lungs is blocked by an embolus (blood clot).
<b>Pulmonary oedema</b>	Accumulation of fluid in the lungs.
<b>Purpura</b>	Small haemorrhage in the skin.
<b>Pyelonephritis</b>	Infection of the kidneys due to bacteria that have come up from the bladder after entering through the urethra.

## R

<b>Rales</b>	A rattling sound heard when listening to lungs that are diseased.
<b>Recumbent position</b>	Lying down.
<b>Resistant bacteria</b>	Bacteria which are not killed by a drug that usually kills that kind of bacteria.
<b>Resuscitation</b>	Bringing back to life or consciousness a person who is apparently dead.
<b>Retained placenta</b>	Describes the situation when the placenta has not been delivered within 30 minutes after the birth of the baby.
<b>Retracted</b>	Drawn back.
<b>Retroplacental</b>	Behind or underneath the placenta.
<b>Reversal</b>	A turn or change in the opposite direction.
<b>Rhesus factor</b>	An antigen present on the red blood cells of most people. Those having this antigen are classified “rhesus positive”. Those that do not have it are “rhesus negative”. Rhesus incompatibility occurs when the mother is “rhesus negative” and the fetus is “rhesus positive”.
<b>Rickets</b>	Softening of bones due to vitamin D deficiency during childhood.
<b>Risk factor</b>	Factors which make a condition more likely to happen or more dangerous.
<b>Rotation</b> (of fetal head)	The movement of the fetal head as it descends through the birth canal.
<b>Rupture</b>	Tearing or bursting of a structure, e.g. rupture of uterus following obstructed labour.
<b>Ruptured uterus</b>	Tearing or bursting of the uterus due to obstructed labour.

## S

<b>Sacral promontory</b>	The part of the first sacral vertebra which projects into the pelvic inlet.
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<b>Sacrum</b>	The lowest part of the spine. It is formed by five sacral vertebrae.
<b>Sagittal suture</b>	The membranous line between fetal skull bones (parietal bones) running from the posterior fontanelle to the anterior fontanelle.
<b>Sanitation</b>	The establishment of conditions favourable to health. It includes the safe disposal of faeces by the use of adequate latrines, to avoid the transmission of diseases.
<b>Scoliosis</b>	A lateral deviation in the normally straight vertical line of the spine.
<b>Secondary postpartum haemorrhage</b>	Includes all cases of PPH occurring between 24 hours after delivery of the baby and 6 weeks postpartum.
<b>Segment</b>	A section or a part of something.
<b>Self-retaining catheter</b>	A catheter that is left <i>in situ</i> in the bladder.
<b>Semiprone position</b>	Lying down on the left side.
<b>Semi-recumbent position</b>	Lying down with head and shoulders raised up.
<b>Septic shock</b>	A very serious infection of the blood stream causing high fever, low blood pressure, fast pulse and fast breathing. Untreated septic shock leads to coma and death.
<b>Septicaemia</b>	The presence and multiplication in the blood of harmful micro-organisms in the blood, causing high fever and chills. Untreated, septicaemia can lead to shock and death.
<b>Shock</b>	A life-threatening condition characterized by failure of the circulatory system to maintain normal blood flow to vital organs (e.g. kidneys, heart brain).  <b><i>Haemorrhagic shock</i></b> is shock due to low blood volume resulting from excessive blood loss.  <b><i>Septic shock</i></b> is shock due to overwhelming infection and results from the action of the pathogenic bacteria on the vascular system.
<b>Sinciput</b>	The brow, or forehead.
<b>Sinusitis</b>	Infection in the sinuses (air cavities in the cranial bones on either side of the nose and above the eyes).
<b>Sitz bath</b>	Soaking of the genital area in a tub of clean warm water. This may be done in the postpartum to soothe pain from an episiotomy or perineal tear.
<b>Smear</b>	A specimen of superficial cells, e.g. from the cervix or vagina, which can be examined microscopically and gives information about the level of hormones or early malignant disease.
<b>Sodium lactate</b>	A solution of sodium lactate, sodium chloride, potassium chloride and calcium chloride which can be given via an intravenous infusion.
<b>Sonar</b>	A term for ultrasound in medical diagnosis.

<b>Spasms</b>	Sudden, strong, involuntary muscular contractions.
<b>Specific gravity</b>	Relative weight of any kind of matter (e.g. urine), expressed by the ratio of the weight of a certain volume of that matter to the weight of the same volume of water. The specific gravity of water is 1.
<b>Specimen</b>	A sample or part of a thing taken to determine the character of the whole e.g. specimen of urine.
<b>Splint</b>	A strip of rigid material such as wood, used to keep in place a movable body part.
<b>Sputum</b>	Matter ejected from the lungs, bronchi and trachea, through the mouth.
<b>Stasis (of urine)</b>	Standing still, not flowing properly.
<b>Stat</b>	A medical abbreviation meaning "at once".
<b>Statistics</b>	A collection of numerical facts.
<b>Status</b>	Social position, relative importance of a person.
<b>Stenosis (of vagina)</b>	Narrowing of the vagina which is usually due to scarring caused by genital mutilation or unrepaired lacerations.
<b>Stillbirth</b>	A baby that is delivered dead (after the 22nd week of pregnancy).
<b>Stillborn</b>	A baby that is delivered dead.
<b>Stunted growth</b>	When a person is short, often because of insufficient food intake during childhood.
<b>Subarachnoid haemorrhage</b>	Bleeding within the membranes enveloping the brain due to a ruptured blood vessel.
<b>Subinvolution (uterus)</b>	The uterus is not reducing in size normally, (i.e. is slow to involute) during the early postpartum period.
<b>Suboccipitobregmatic diameter (of head)</b>	The distance from beneath the occiput to the anterior fontanelle.
<b>Symphiotomy</b>	A surgical incision of the symphysis pubis to widen the pelvic outlet when there is cephalopelvic disproportion. It is an alternative emergency procedure when facilities for safe caesarean section are not available.
<b>Symphysis pubis</b>	The cartilaginous area where the two pubic bones join at the front of the pelvis
<b>T</b>	
<b>Talipes</b>	Clubfoot. A congenital abnormality when the foot has developed at an abnormal angle to the leg.
<b>Tenderness</b>	Painful when palpated.
<b>Term baby</b>	Baby born between 37 and 42 completed weeks of pregnancy.

<b>Testicles/testes</b>	The two glands in the scrotum which produce spermatozoa and male sex hormones.
<b>Tetanus</b>	A disease caused by microorganisms found in the soil and dust which is spread by animal and human faeces. The microorganisms enter the body through a break in the skin and cause a severe condition with muscle spasm and convulsions leading to death. Because stiffness of the jaw is often the first symptom, it is also known as lockjaw. This severe disease can be prevented by adequate immunization with tetanus toxoid.
<b>Thorax</b>	The chest.
<b>Thrombophlebitis</b>	Inflammation of a superficial vein together with clot formation. In these cases the clot rarely separates from the wall of the vein and so the risk of embolism is small.
<b>Thrombosis</b>	The formation of a blood clot. This occurs in the deep veins and if the clot becomes detached from the vessel wall, there is a serious risk of embolism leading to death.
<b>Tocolytic agent</b>	An agent that stops uterine contractions, e.g. ritodrine hydrochloride, salbutamol.
<b>Traditional birth attendant (TBA)</b>	Name given to a person who traditionally assists women in childbirth at community level. Most are illiterate and become birth attendants without training, but efforts are now being made to give them basic training for a few weeks, and to encourage them to use basic but essential birthing kits. They are not considered as a “skilled birth attendant” but do have an important role to play in the community - to be linked to skilled birth attendants.
<b>Transient</b>	Temporary, not lasting a long time.
<b>Trauma</b>	Injury.
<b>Traumatic bleeding</b>	In obstetrics, occurs as a result of injury to the genital tract.
<b>Tumour</b>	A new growth of tissue which could be benign (harmless) or cancerous.
<b>Twitch</b>	Sudden, small, involuntary contractions.
<b>U</b>	
<b>Ultrasound</b>	Sound at frequencies above the upper limit of normal hearing which is used in obstetrics (and other branches of medicine) in the technique of ultrasonography. It is used to assess the maturity and size of the fetus, locate the site of the placenta, diagnose fetal abnormalities and pelvic tumours.
<b>Umbilical cord</b>	The cord which connects the fetus to its placenta. Nourishment and oxygen pass along the umbilical vein from the placenta to the fetus. Waste products pass from the fetus to the placenta via two umbilical arteries.

<b>Uraemia</b>	An excess of urea in the blood. It is one of the signs of chronic kidney failure.
<b>Utero vesical pouch</b>	The pocket-like space between the uterus and the bladder.
<b>Uterus inversion</b>	The uterus is turned inside out, with the fundus of the uterus being forced through the cervix and protruding into or right outside of the vagina. It is a serious obstetric emergency which leads to severe shock. The uterus must be replaced as quickly as possible.
<b>V</b>	
<b>Vacuum extraction</b>	A procedure in which a metal or plastic cup is attached to the baby's head by creating a vacuum. By gently pulling on the chain leading to the cup during contractions, the baby's head gradually descends through the birth canal. It is important to check that there is no cephalo-pelvic disproportion before attempting a vacuum delivery.
<b>Vaginal fornix</b>	The space formed between the vaginal wall and the part of the cervix which projects into the vagina. There are four fornices, the anterior, posterior and two lateral fornices.
<b>Varicose veins</b>	Veins that are abnormally tortuous and distended. If painful during pregnancy, the woman should be advised to wear support stockings which should be applied before the woman rises to her feet in the morning, and to rest with her legs elevated above the level of the heart.
<b>Venepuncture</b>	The puncture of a vein to get a blood sample or to set up an intravenous infusion.
<b>Vertex</b>	The area of the head between the anterior and posterior fontanelles and the two parietal eminences (i.e. bumps on each side top of the head. In normal labour when the head is well-flexed, the vertex presents.
<b>Virus</b>	Small infective agent which grows and reproduces in living cells. Viruses may cross the placenta in pregnancy and cause fetal abnormalities, especially in the first trimester.
<b>Vitamins</b>	Essential food substances. Vitamins A, all of the B's, C, D, E and K are essential to nutrition and health and deficiencies cause a variety of health problems.
<b>W</b>	
<b>Waddling gait</b>	Walking with an exaggerated elevation of the hips (rather like a duck walks).
<b>Water intoxication</b>	The condition caused by excess fluid in the circulation and insufficient sodium. It may be caused by over-transfusion and can lead to nausea, vomiting and, in severe cases, convulsions, coma and death.



## APPENDIX: PRE- AND POST-TEST QUESTIONS

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*The pre- and post-test questions (and answers) which follow are provided as examples, and do not constitute the full and complete range of questions which should be included in pre- and post-tests, should you choose to use them as a method of student assessment. You may wish to use these questions, together with other questions relevant to the content of this module, to establish a baseline for students' theoretical knowledge. The questions used in the pre-test should be used again in the post-test to determine change in theoretical knowledge. The teacher may also wish to add more questions for the post-test.*

*Each time you use the module for teaching about puerperal sepsis, it is important to change at least some of the questions used in pre- and post-tests, as in schools of midwifery and nursing students often discuss the content of tests and examinations.*

*Pre- and post-tests must not be used to the exclusion of other options for assessment of students. It is critical to use at least some, if not all, of the other options, found at intervals throughout the modules, for assessing the progress of students during the course of study. Moreover, it is essential to bear in mind that the assessment of clinical competence constitutes the major component of student assessment in this, and the other technical modules.*

Q1 *What is puerperal sepsis?*

A An infection of the genital tract which occurs after the birth of the baby, usually after the first 24 hours.

Q2 *When the membranes rupture 18 or more hours before the onset of labour, what condition may develop?*

A Chorioamnionitis.

Q3 *Following the birth, where might puerperal sepsis be localized?*

A The perineum, vagina, cervix, or uterus.

Q4 *Name 3 life threatening conditions which may result from puerperal sepsis?*

A Any 3 of the following: septicaemia, septic shock, coagulopathy, peritonitis, pelvic abscess.

Q5 *Name 3 common signs of puerperal sepsis?*

A Any 3 of the following: fever, chills, lower abdominal pain, tender uterus, purulent, foul-smelling lochia.

Q6 *What are 4 risk factors for puerperal sepsis which could be identified on history taking?*

A Any 4 of the following: prolonged rupture of membranes, prolonged labour, unskilled delivery attendant, unclean delivery equipment, insertion of harmful substances into the vagina (e.g. cow dung), operative delivery, excessive haemorrhage after birth, presence of sexually transmitted infection during pregnancy, presence of diabetes or anaemia, woman not immunized for tetanus.

- Q7 *What are 3 risk factors for puerperal sepsis which could be identified by physical examination?*
- A Any 3 of the following: evidence of anaemia (pallor of palms and conjunctiva), evidence of retained placental fragments, uterus soft and bulky with excessive lochia, unrepaired vaginal or cervical lacerations.
- Q8 *What investigations may be required for the diagnosis of puerperal sepsis?*
- A High vaginal swab, midstream specimen of urine, throat swab, wound swab, blood culture.
- Q9 *Name any 2 organisms that commonly cause puerperal sepsis?*
- A Any 2 of the following: streptococci, staphylococci, E.coli, clostridium tetani, clostridium welchii, chlamydia and gonococci.
- Q10 *What is the preferred route of administration for antibiotics in the case of severe puerperal sepsis, and why?*
- A The intravenous route, because the effect of the antibiotics is more rapid than when administered by other routes.