



Primary Maternal Care

Antenatal and postnatal care
in the clinic

Developed by the Perinatal Education
Programme

bettercare
FROM EBW

Very important: We have taken every care to ensure that drug dosages and related medical advice in this book are accurate. However, drug dosages can change and are updated often, so always double-check dosages and procedures against a reliable, up-to-date formulary and the given drug's documentation before administering it.

Primary Maternal Care: Antenatal and postnatal care in the clinic

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Introduction

About the Bettercare series

Bettercare publishes an innovative series of distance-learning books for healthcare professionals, developed by the Perinatal Education Trust, Eduhealthcare, the Desmond Tutu HIV Foundation and the Desmond Tutu TB Centre, with contributions from numerous experts.

Our aim is to provide appropriate, affordable and up-to-date learning material for healthcare workers in under-resourced areas, so that they can manage their own continuing education courses which will enable them to learn, practise and deliver skillful, efficient patient care.

The Bettercare series is built on the experience of the Perinatal Education Programme (PEP), which has provided learning opportunities to over 60 000 nurses and doctors in South Africa since 1992. Many of the educational methods developed by PEP are now being adopted by the World Health Organisation (WHO).

Why decentralised learning?

Continuing education for healthcare workers traditionally consists of courses and workshops run by formal trainers at large central hospitals. These teaching courses are expensive to attend, often far away from the healthcare workers' families and places of work, and the content frequently fails to address the real healthcare requirements of the poor, rural communities who face the biggest healthcare challenges.

To help solve these many problems, a self-help decentralised learning method has been developed which addresses the needs of professional healthcare workers, especially those in poor, rural communities.

Books in the Bettercare series

Maternal Care addresses all the common and important problems that occur during pregnancy, labour, delivery and the puerperium. It covers the antenatal and postnatal care of healthy women with normal pregnancies, monitoring and managing the progress of labour, specific medical problems during pregnancy, labour and the puerperium, family planning and regionalised perinatal care. Skills workshops teach clinical examination in pregnancy and labour, routine screening tests, the use of an antenatal card and partogram, measuring blood pressure, detecting proteinuria and performing and repairing an episiotomy. *Maternal Care* is aimed at healthcare workers in level 1 hospitals or clinics.

Primary Maternal Care addresses the needs of healthcare workers who provide antenatal and postnatal care, but do not conduct deliveries. It is adapted from theory chapters and skills workshops from *Maternal Care*. This book is ideal for midwives and doctors providing primary maternal care in level 1 district hospitals and clinics, and complements the national protocol of antenatal care in South Africa.

Intrapartum Care was developed for doctors and advanced midwives who care for women who deliver in district hospitals. It contains theory chapters and skills workshops adapted from the labour chapters of *Maternal Care*. Particular attention is given to the care of the mother, the management of labour and monitoring the wellbeing of the fetus. *Intrapartum Care* was written to support and complement the national protocol of intrapartum care in South Africa.

Newborn Care was written for healthcare workers providing special care for newborn infants in regional hospitals. It covers resuscitation at birth, assessing infant size and gestational age, routine care and feeding of both normal and high-risk infants, the prevention, diagnosis and management of hypothermia, hypoglycaemia, jaundice, respiratory distress, infection, trauma, bleeding and congenital abnormalities, as well as communication with parents. Skills workshops address resuscitation, size measurement, history, examination and clinical notes, nasogastric feeds, intravenous infusions, use of incubators, measuring blood glucose concentration,

insertion of an umbilical vein catheter, phototherapy, apnoea monitors and oxygen therapy.

Primary Newborn Care was written specifically for nurses and doctors who provide primary care for newborn infants in level 1 clinics and hospitals. Primary Newborn Care addresses the care of infants at birth, care of normal infants, care of low-birth-weight infants, neonatal emergencies, and common minor problems in newborn infants.

Mother and Baby Friendly Care describes gentler, kinder, evidence-based ways of caring for women during pregnancy, labour and delivery. It also presents improved methods of providing infant care with an emphasis on kangaroo mother care and exclusive breastfeeding.

Saving Mothers and Babies was developed in response to the high maternal and perinatal mortality rates found in most developing countries. Learning material used in this book is based on the results of the annual confidential enquiries into maternal deaths and the Saving Mothers and Saving Babies reports published in South Africa. It addresses the basic principles of mortality audit, maternal mortality, perinatal mortality, managing mortality meetings and ways of reducing maternal and perinatal mortality rates. This book should be used together with the Perinatal Problem Identification Programme (PPIP).

Birth Defects was written for healthcare workers who look after individuals with birth defects, their families, and women who are at increased risk of giving birth to an infant with a birth defect. Special attention is given to modes of inheritance, medical genetic counselling, and birth defects due to chromosomal abnormalities, single gene defects, teratogens and multifactorial inheritance. This book is being used in the Genetics Education Programme which trains healthcare workers in genetic counselling in South Africa.

Perinatal HIV enables midwives, nurses and doctors to care for pregnant women and their infants in communities where HIV infection is common. Special emphasis has been placed on the prevention of mother-to-infant transmission of HIV. It covers the basics of HIV infection and screening, antenatal and intrapartum care of women with HIV infection, care of HIV-exposed newborn infants, and parent counselling.

Childhood HIV enables nurses and doctors to care for children with HIV infection. It addresses an introduction to HIV in children, the clinical and

immunological diagnosis of HIV infection, management of children with and without antiretroviral treatment, antiretroviral drugs, opportunistic infections and end-of-life care.

Childhood TB was written to enable healthcare workers to learn about the primary care of children with tuberculosis. The book covers an introduction to TB infection, and the clinical presentation, diagnosis, management and prevention of tuberculosis in children and HIV/TB co-infection. Childhood TB was developed by paediatricians with wide experience in the care of children with tuberculosis, under the auspices of the Desmond Tutu Tuberculosis Centre at the University of Stellenbosch.

Child Healthcare addresses all the common and important clinical problems in children, including immunisation, history and examination, growth and nutrition, acute and chronic infections, parasites, skin conditions, and difficulties in the home and society. Child Healthcare was developed for use in primary care settings.

Adult HIV covers an introduction to HIV infection, management of HIV-infected adults at primary-care clinics, preparing patients for antiretroviral (ARV) treatment, ARV drugs, starting and maintaining patients on ARV treatment and an approach to opportunistic infections. Adult HIV was developed by doctors and nurses with wide experience in the care of adults with HIV, under the auspices of the Desmond Tutu HIV Foundation at the University of Cape Town.

Well Women was written for primary health workers who manage the everyday health needs of women. It covers reproductive health, family planning and infertility, common genital infections, vaginal bleeding, and the abuse of women.

Breast Care was written for nurses and doctors who manage the health needs of women from childhood to old age. It covers the assessment and management of benign breast conditions, breast cancer and palliative care.

Infection Prevention and Control was written for nurses, doctors, and health administrators working in the field of infection prevention and control, particularly in resource-limited settings. It includes chapters on IPC programmes, risk management, health facility design, outbreak surveillance and antimicrobial stewardship.

Format of the courses

1. Objectives

The learning objectives are clearly stated at the start of each chapter. They help the participant to identify and understand the important lessons to be learned.

2. Pre- and post-tests

There is a multiple-choice test of 20 questions for each chapter at the end of the book. Participants are encouraged to take a pre-test before starting each chapter, to benchmark their current knowledge, and a post-test after each chapter, to assess what they have learned. Self-assessment allows participants to monitor their own progress through the course.

3. Question-and-answer format

Theoretical knowledge is presented in a question-and-answer format, which encourages the learner to actively participate in the learning process. In this way, the participant is led step by step through the definitions, causes, diagnosis, prevention, dangers and management of a particular problem.

Participants should cover the answer for a few minutes with a piece of paper while thinking about the correct reply to each question. This method helps learning.

Simplified flow diagrams are also used, where necessary, to indicate the correct approach to diagnosing or managing a particular problem. Each question is written in bold, like this, and is identified with the number of the chapter, followed by the number of the question, e.g. 5-23.

4. Important lessons

Important practical lessons are emphasised by placing them in a box like this.

5. Notes

NOTE

Additional, non-essential information is provided for interest and given in notes like this. These facts are not used in the case studies or included in the multiple-choice questions.

6. Case studies

Each chapter closes with a few case studies which encourage the participant to consolidate and apply what was learned earlier in the chapter. These studies give the participant an opportunity to see the problem as it usually presents itself in the clinic or hospital. The participant should attempt to answer each question in the case study before reading the correct answer.

7. Practical training

Certain chapters contain skills workshops, which need to be practised by the participants (preferably in groups). The skills workshops, which are often illustrated with line drawings, list essential equipment and present step-by-step instructions on how to perform each task. If participants aren't familiar with a practical skill, they are encouraged to ask an appropriate medical or nursing colleague to demonstrate the clinical skill to them. In this way, senior personnel are encouraged to share their skills with their colleagues.

8. Final examination

On completion of each course, participants can take a 75-question multiple-choice examination.

All the exam questions will be taken from the multiple-choice tests from the book. The content of the skills workshops will not be included in the examination.

Participants need to achieve at least 80% in the examination in order to successfully complete the course. Successful candidates will be emailed a certificate which states that they have successfully completed that course. Bettercare courses are not yet accredited for nurses, but South African doctors can earn CPD points on the successful completion of an examination.

Contributors

The developers of our learning materials are a multi-disciplinary team of nurses, midwives, obstetricians, neonatologists, and general paediatricians. The development and review of all course material is overseen by the Editor-in-Chief, emeritus Professor Dave Woods, a previous head of neonatal medicine at the University of Cape Town who now consults to UNICEF and the WHO.

Perinatal Education Trust

Books developed by the Perinatal Education Programme are provided as cheaply as possible. Writing and updating the programme is both funded and managed on a non-profit basis by the Perinatal Education Trust.

Eduhealthcare

Eduhealthcare is a non-profit organisation based in South Africa. It aims to improve health and wellbeing, especially in poor communities, through affordable education for healthcare workers. To this end it provides financial support for the development and publishing of the Bettercare series.

The Desmond Tutu HIV Foundation

The Desmond Tutu HIV Foundation at the University of Cape Town, South Africa, is a centre of excellence in HIV medicine, building capacity through training and enhancing knowledge through research.

The Desmond Tutu Tuberculosis Centre

The Desmond Tutu Tuberculosis Centre at Stellenbosch University, South Africa, strives to improve the health of vulnerable groups through the education of healthcare workers and community members, and by influencing policy based on research into the epidemiology of childhood tuberculosis, multi-drug-resistant tuberculosis, HIV/TB co-infection and preventing the spread of TB and HIV in southern Africa.

Updating the course material

Bettercare learning materials are regularly updated to keep up with developments and changes in healthcare protocols. Course participants can make important contributions to the continual improvement of Bettercare books by reporting factual or language errors, by identifying sections that are difficult to understand, and by suggesting additions or improvements to the contents. Details of alternative or better forms of management would be particularly appreciated. Please send any comments or suggestions to the Editor-in-Chief, Professor Dave Woods.

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1

Antenatal care

Before you begin this unit, please take the corresponding test to assess your knowledge of the subject matter. You should redo the test after you've worked through the unit, to evaluate what you have learned.

Objectives

When you have completed this unit you should be able to:

- List the goals of good antenatal care.
- Diagnose pregnancy.
- Know what history should be taken and examination done at the first visit.
- Determine the duration of pregnancy.
- List and assess the results of the side room and screening tests needed at the first visit.
- Identify low, intermediate and high-risk pregnancies.
- Plan and provide antenatal care that is problem oriented.
- List what specific complications to look for at 28, 34 and 41 weeks.
- Provide health information during antenatal visits.
- Manage women with HIV infection.

Goals of good antenatal care

1-1 What are the aims and principles of good antenatal care?

The aims of good antenatal care are to ensure that pregnancy causes no harm to the mother and to keep the fetus healthy during the antenatal period. In addition, the opportunity must be taken to provide health education. These aims can usually be achieved by the following:

1. Antenatal care must follow a definite plan.
2. Antenatal care must be problem oriented.
3. Possible complications and risk factors that may occur at a particular gestational age must be looked for at these visits.
4. The fetal condition must be repeatedly assessed.
5. Health care education must be provided.

All information relating to the pregnancy must be entered on a patient-held antenatal card. The antenatal card can also serve as a referral letter if a patient is referred to the next level of care and therefore serves as a link between the different levels of care as well as the antenatal clinic and labour ward.

The antenatal card is an important source of information during the antenatal period and labour.

Diagnosing pregnancy

1-2 How can you confirm that a patient is pregnant?

The common symptoms of pregnancy are amenorrhoea (no menstruation), nausea, breast tenderness and urinary frequency. If the history suggests that a patient is pregnant, the diagnosis is easily confirmed by testing the urine with a standard pregnancy test. The test becomes positive by the time the first menstrual period is missed.

A positive pregnancy test is produced by both an intra-uterine and an extra-uterine pregnancy. Therefore, it is important to establish whether the pregnancy is intra-uterine or not.

Confirm that the patient is pregnant before beginning antenatal care.

1-3 How do you diagnose an intra-uterine pregnancy?

The characteristics of an intra-uterine pregnancy are:

1. The size of the uterus is appropriate for the duration of pregnancy.
2. There is no lower abdominal pain or vaginal bleeding.
3. There is no tenderness of the lower abdomen.

1-4 How do you diagnose an extra-uterine pregnancy?

The characteristics of an extra-uterine (ectopic) pregnancy are:

1. The uterus is smaller than expected for the duration of pregnancy.
2. Lower abdominal pain and vaginal bleeding are usually present.
3. Tenderness over the lower abdomen is usually present.

The first antenatal visit

This visit is usually the patient's first contact with the medical services during her pregnancy. She must be treated with kindness and understanding in order to gain her confidence and to ensure her future co-operation and regular attendance. This opportunity must be taken to book the patient for antenatal care and, thereby, ensure the early detection and management of treatable complications.

1-5 At what gestational age should a patient first attend an antenatal clinic?

As early as possible, preferably when the second menstrual period has been missed, i.e. at a gestational age (duration of pregnancy) of 8 weeks. Note that for practical reasons the gestational age is measured from the first day of the last normal menstrual period. Antenatal care should start at the time that the pregnancy is confirmed.

It is important that all pregnant women book as early as possible.

1-6 What are the aims of the first antenatal visit?

1. A full history must be taken.
2. A full physical examination must be done.

3. The duration of pregnancy must be established.
4. Important screening tests must be done.
5. Some high-risk patients can be identified.

1-7 What history should be taken?

A full history, containing the following:

1. The previous obstetric history.
2. The present obstetric history.
3. A medical history.
4. HIV status.
5. History of medication and allergies.
6. A surgical history.
7. A family history.
8. The social circumstances of the patient.

1-8 What is important in the previous obstetric history?

1. Establish the number of pregnancies (gravidity), the number of previous pregnancies reaching viability (parity) and the number of miscarriages and ectopic pregnancies that the patient may have had. This information may reveal the following important factors:
 - Grande multiparity (i.e. 5 or more pregnancies which have reached viability).
 - Miscarriages: 3 or more successive first trimester miscarriages suggest a possible genetic abnormality in the father or mother. A previous midtrimester miscarriage suggests a possible incompetent internal cervical os.
 - Ectopic pregnancy: ensure that the present pregnancy is intra-uterine.
 - Multiple pregnancy: non-identical twins tend to recur.
2. The birth weight, gestational age and method of delivery of each previous infant as well as of previous perinatal deaths are important:
 - Previous low birth weight infants or spontaneous preterm labours tend to recur.
 - Previous large infants (4 kg or more) suggest maternal diabetes.
 - The type of previous delivery is also important: a forceps delivery or vacuum extraction may suggest that a degree of cephalopelvic disproportion had been present. If the patient had a previous caesarean section, the indication for the caesarean section must be determined.

- The type of incision in the uterus is also important (this information must be obtained from the patient's folder) as only patients with a transverse lower segment incision should be considered for a possible vaginal delivery.
 - Having had one or more perinatal deaths places the patient at high risk of further perinatal deaths. Therefore, every effort must be made to find out the cause of any previous deaths. If no cause can be found, then the risk of a recurrence of perinatal death is even higher.
3. Previous complications of pregnancy or labour:
 - In the antenatal period, e.g. pre-eclampsia, preterm labour, diabetes, and antepartum haemorrhage. Patients who develop pre-eclampsia before 34 weeks gestation have a greater risk of pre-eclampsia in further pregnancies.
 - First stage of labour, e.g. a long labour.
 - Second stage of labour, e.g. impacted shoulders.
 - Third stage of labour, e.g. a retained placenta or a postpartum haemorrhage.

Complications in previous pregnancies tend to recur in subsequent pregnancies. Therefore, patients with a previous perinatal death are at high risk of another perinatal death, while patients with a previous spontaneous preterm labour are at high risk of preterm labour in their next pregnancy.

1-9 What information should be asked for when taking the present obstetric history?

1. The first day of the last normal menstrual period must be determined as accurately as possible.
2. Any medical or obstetric problems which the patient has had since the start of this pregnancy, for example:
 - Pyrexial illnesses (such as influenza) with or without skin rashes.
 - Symptoms of a urinary tract infection.
 - Any vaginal bleeding.
3. Attention must be given to minor symptoms which the patient may experience during her present pregnancy, for example:
 - Nausea and vomiting.
 - Heartburn.

- Constipation.
 - Oedema of the ankles and hands.
4. Is the pregnancy planned and wanted, and was there a period of infertility before she became pregnant?
 5. If the patient is already in the third trimester of her pregnancy, attention must be given to the condition of the fetus.

1-10 What important facts must be considered when determining the date of the last menstrual period?

1. The date should be used to measure the duration of pregnancy only if the patient had a regular menstrual cycle.
2. Were the date of onset and the duration of the last period normal? If the last period was shorter in duration and earlier in onset than usual, it may have been an implantation bleed. Then the previous period must be used to determine the duration of pregnancy.
3. Patients on oral or injectable contraception must have menstruated spontaneously after stopping contraception, otherwise the date of the last period should not be used to measure the duration of pregnancy.

1-11 Why is the medical history important?

Some medical conditions may become worse during pregnancy, e.g. a patient with heart valve disease may go into cardiac failure while a hypertensive patient is at high risk of developing pre-eclampsia.

Ask the patient if she has had any of the following:

1. Hypertension.
2. Diabetes mellitus.
3. Rheumatic or other heart disease.
4. Epilepsy.
5. Asthma.
6. Tuberculosis.
7. Psychiatric illness.
8. Any other major illness.

It is important to ask whether the patient knows her HIV status. If she had an HIV test, both the date and result need to be noted. If she is HIV positive, record whether she is on antiretroviral (ARV) treatment (ART) and which

drugs she is taking. If she is not on ARV treatment, note whether she knows her CD4 count and when it was done.

1-12 Why is it important to ask about any medication taken and a history of allergy?

1. Ask about the regular use of any medication. This is often a pointer to an illness not mentioned in the medical history.
2. Certain drugs can be teratogenic (damage the fetus) during the first trimester of pregnancy, e.g. retinoids which are used for acne and efavirenz (Stocrin) used in antiretroviral treatment.
3. Some drugs can be dangerous to the fetus if they are taken close to term, e.g. Warfarin.
4. Allergies are also important and the patient must be specifically asked if she is allergic to penicillin.

1-13 What previous operations may be important?

1. Operations on the urogenital tract, e.g. caesarean section, myomectomy, a cone biopsy of the cervix, operations for stress incontinence and vesicovaginal fistula repair.
2. Cardiac surgery, e.g. heart valve replacement.

1-14 Why is the family history important?

Close family members with a condition such as diabetes, multiple pregnancy, bleeding tendencies or mental retardation increases the risk of these conditions in the patient and her unborn infant. Some birth defects are inherited.

1-15 Why is information about the patient's social circumstances very important?

1. Ask if the woman smokes cigarettes or drinks alcohol. Smoking may cause intra-uterine growth restriction while alcohol may cause both intra-uterine growth restriction and congenital malformations.
2. The unmarried mother may need help to assist her to plan for the care of her infant.
3. Unemployment, poor housing and overcrowding increase the risk of tuberculosis, malnutrition and intra-uterine growth restriction. Patients living in poor social conditions need special support and help.

1-16 To which systems must you pay particular attention when doing a physical examination?

1. The general appearance of the patient is of great importance as it can indicate whether or not she is in good health.
2. A woman's height and weight may reflect her past and present nutritional status.
3. In addition the following systems or organs must be carefully examined:
 - The thyroid gland.
 - The breasts.
 - Lymph nodes in the neck, axillae (armpits) and inguinal areas.
 - The respiratory system.
 - The cardiovascular system.
 - The abdomen.
 - Both external and internal genitalia.

1-17 What is important in the examination of the thyroid gland?

1. A thyroid gland which is visibly enlarged is possibly abnormal and must be examined by a doctor.
2. A thyroid gland which on palpation is only slightly, diffusely enlarged is normal in pregnancy.
3. An obviously enlarged gland, a single palpable nodule or a nodular goitre is abnormal and needs further investigation.

1-18 What is important in the examination of the breasts?

1. Inverted or flat nipples must be diagnosed and treated so that the patient will be more likely to breastfeed successfully.
2. A breast lump or a blood-stained discharge from the nipple must be investigated further as it may indicate the presence of a tumour.
3. Whenever possible, patients should be advised and encouraged to breastfeed. Teaching the advantages of breastfeeding is an essential part of antenatal care and must be emphasised in the following groups of women:
 - HIV-negative women.
 - Women with unknown HIV status.
 - HIV-positive women who have elected to exclusively breastfeed.

1-19 What is important in the examination of the respiratory and cardiovascular systems?

1. Look for any signs which suggest that the patient has difficulty breathing (dyspnoea).
2. The blood pressure must be measured and the pulse rate counted.

1-20 How do you examine the abdomen at the booking visit?

1. The abdomen is palpated for enlarged organs or masses.
2. The height of the fundus above the symphysis pubis is measured.

1-21 What must be looked for when the external and internal genitalia are examined?

1. Signs of sexually transmitted diseases which may present as single or multiple ulcers, a purulent discharge or enlarged inguinal lymph nodes.
2. Carcinoma of the cervix is the commonest form of cancer in most communities. Advanced stages of this disease present as a wart-like growth or an ulcer on the cervix. A cervix which looks normal does not exclude the possibility of an early cervical carcinoma.

1-22 When must a cervical smear be taken when examining the internal genitalia (gynaecological examination)?

1. All patients aged 30 years or more who have not previously had a cervical smear that was reported as normal.
2. All patients who have previously had a cervical smear that was reported as abnormal.
3. All patients who have a cervix that looks abnormal.
4. All HIV-positive patients who did not have a cervical smear reported as normal within the last year.

A cervix that looks normal may have an early carcinoma.

Determining the duration of pregnancy

All available information is now used to assess the duration of pregnancy as accurately as possible:

1. Last normal menstrual period.
2. Size of the uterus on bimanual or abdominal examination up to 18 weeks.
3. Height of fundus at or after 18 weeks.
4. The result of an ultrasound examination (ultrasonology).

An accurate assessment of the duration of pregnancy is of great importance, especially if the woman develops complications later in her pregnancy.

1-23 When is the duration of pregnancy calculated from the last normal menstrual period?

When there is certainty about the accuracy of the dates of the last, normal menstrual period. The duration of pregnancy is then calculated from the first day of that period.

1-24 How does the size of the uterus indicate the duration of pregnancy?

1. Up to 12 weeks the size of the uterus, assessed by bimanual examination, is a reasonably accurate method of determining the duration of pregnancy. Therefore, if there is uncertainty about the duration of pregnancy before 12 weeks the patient should be referred for a bimanual examination.
2. From 13 to 17 weeks, when the fundus of the uterus is still below the umbilicus, the abdominal examination is the most accurate method of determining the duration of pregnancy.
3. From 18 weeks, the symphysis-fundus height measurement is the more accurate method.

1-25 How should you determine the duration of pregnancy if the uterine size and the menstrual dates do not indicate the same gestational age?

1. If the fundus is below the umbilicus (in other words, the patient is less than 22 weeks pregnant):
 - If the dates and the uterine size differ by 3 weeks or more, the uterine size should be considered as the more accurate indicator of the duration of pregnancy.
 - If the dates and the uterine size differ by less than 3 weeks, the dates are more likely to be correct.
2. If the fundus is at or above the umbilicus (in other words, the patient is 22 weeks or more pregnant):
 - If the dates and the uterine size differ by 4 weeks or more, the uterine size should be considered as the more accurate indicator of the duration of pregnancy.
 - If the dates and the uterine size differ by less than 4 weeks, the dates are more likely to be correct.

1-26 How should you use the symphysis-fundus height measurement to determine the duration of pregnancy?

From 18 weeks gestation, the symphysis-fundus (S-F) height measurement in cm is plotted on the 50th centile of the S-F growth curve to determine the

duration of pregnancy. For example, a S-F measurement of 26 cm corresponds to a gestation of 27 weeks.

A difference between the gestational age according to the menstrual dates and the size of the uterus is usually the result of incorrect dates.

1-27 What conditions other than incorrect menstrual dates cause a difference between the duration of pregnancy calculated from menstrual dates and the size of the uterus?

1. A uterus bigger than dates suggests:
 - Multiple pregnancy.
 - Polyhydramnios.
 - A fetus which is large for the gestational age.
 - Diabetes mellitus.
2. A uterus smaller than dates suggests:
 - Intra-uterine growth restriction.
 - Oligohydramnios.
 - Intra-uterine death.
 - Rupture of the membranes.

Side room and special screening investigations

1-28 Which side room screening investigations must be done routinely?

1. A haemoglobin estimation at the first antenatal visit and again at 28 and 36 weeks.
2. A urine test for protein and glucose is done at every visit.

1-29 What special investigations should be done routinely?

1. A laboratory serological screening test for syphilis such as a VDRL, RPR or TPHA test. An on-site RPR card test or syphilis rapid test can be performed in the clinic, if a laboratory is not within easy reach of the hospital or clinic.
2. Determining whether the patient's blood group is Rh positive or negative. A Rh card test can be done in the clinic.
3. A rapid HIV screening test after health worker initiated counselling and preferably after written consent.
4. A smear of the cervix for cytology if it is indicated.
5. If possible, all patients should have a midstream urine specimen examined for asymptomatic bacteriuria. The best test is bacterial culture of the urine.
6. Where possible, an ultrasound examination when the patient is 18–22 weeks pregnant can be arranged

NOTE

Ultrasound screening at 11 to 13 weeks for nuchal thickness, or the triple test, is very useful in screening for Down syndrome and other chromosomal abnormalities. Written informed consent for HIV testing is not a legal requirement in South Africa, but recommended as good practice.

1-30 Is it necessary to do an ultrasound examination on all patients who book early enough for antenatal care?

With well-trained ultrasonographers and adequate ultrasound equipment, it is of great value to:

1. Accurately determine the gestational age if the first ultrasound examination is done at 24 weeks or less. With uncertain gestational age the fundal height will measure less than 24 cm.
2. Diagnose multiple pregnancies early.
3. Identify the site of the placenta.
4. Diagnose severe congenital abnormalities.

If it is not possible to provide ultrasound examinations to all antenatal patients before 24 weeks gestation, the following groups of patients may benefit greatly from the additional information which may be obtained:

1. Patients with a gestational age of 14 to 16 weeks:
 - Patients aged 37 years or more because of their increased risk of having a fetus with a chromosomal abnormality (especially Down syndrome). A

patient who would agree to termination of pregnancy if the fetus was abnormal, should be referred for amniocentesis.

- Patients with a previous history or family history of congenital abnormalities. The nearest hospital with a genetic service should be contacted to determine the need for amniocentesis.
- 2. Patients with a gestational age of 18 to 22 weeks:
 - Patients needing elective delivery (e.g. those with 2 previous caesarean sections, a previous perinatal death, a previous vertical uterine incision or hysterotomy, and diabetes).
 - Gross obesity when it is often difficult to determine the duration of pregnancy.
 - Previous severe pre-eclampsia or preterm labour before 34 weeks. As there is a high risk of recurrence of either complication, accurate determination of the duration of pregnancy greatly helps in the management of these patients.
 - Rhesus sensitisation where accurate determination of the duration of pregnancy helps in the management of the patient.

An ultrasound examination done after 24 weeks is too unreliable to be used to estimate the duration of pregnancy.

1-31 What is the assessment of risk after booking the patient?

Once the patient has been booked for antenatal care, it must be assessed whether she or her fetus have complications or risk factors present, as this will decide when she should be seen again. At the first visit some patients should already be placed in a high-risk category.

1-32 If no risk factors are found at the booking visit, when should the patient be seen again?

She should be seen again when the results of the screening tests are available, preferably 2 weeks after the booking visit. However, if no risk factors were noted and the screening tests done as rapid tests were normal the second visit is omitted.

1-33 If there are risk factors noted at the booking visit, when should the patient be seen again?

1. A patient with an underlying illness must be admitted for further investigation and treatment.
2. A patient with a risk factor is followed up sooner if necessary:
 - The management of a patient with chronic hypertension would be planned and the patient would be seen a week later.
 - An HIV-positive patient with an unknown CD4 count must be seen a week later to assess the state of her immune system.

1-34 How should you list risk factors?

All risk factors must be entered on the problem list on the back of the antenatal card. The gestational age when management is needed should be entered opposite the gestational age at the top of the card, e.g. vaginal examination must be done at each visit from 26 to 32 weeks if there is a risk of preterm labour.

The clinic checklist (Figure 1-3) for the first visit could now be completed. If all the open blocks for the first visit can be ticked off, the visit is completed and all important points have been addressed. The checklist should again be used during further visits to make sure that all problems have been considered (i.e. it should be used as a quality control tool).

The second antenatal visit

1-35 What are the aims of the second antenatal visit?

If the results of the screening tests were not available by the end of the first antenatal visit, a second visit should be arranged 2 weeks later to review and act on these results. It would then be important to perform the second screen for risk factors. If possible, all the results of the screening tests should be obtained at the first visit.

Assessing the results of the special screening investigations

1-36 How should you interpret the results of the VDRL or RPR screening tests for syphilis?

The correct interpretation of the results is of the greatest importance:

1. If either the VDRL (Venereal Disease Research Laboratory), or RPR (Rapid Plasmin Reagin) test is negative, then the patient does not have syphilis and no further tests for syphilis are needed.
2. If the VDRL or RPR titre is 1:16 or higher, the patient has syphilis and must be treated.
3. If the VDRL or RPR titre is 1:8 or lower (or the titre is not known), the laboratory should test the same blood sample by means of the TPHA (Treponema Pallidum Haemagglutin Assay) or FTA (Fluorescent Treponemal Antibody) test:
 - If the TPHA or FTA is also positive, the patient has syphilis and must be fully treated.
 - If the TPHA or FTA is negative, then the patient does not have syphilis and, therefore, need not be treated.
 - If a TPHA or FTA test cannot be done, and the patient has not been fully treated for syphilis in the past 3 months, she must be given a full course of treatment. A syphilis rapid test can be done instead of a TPHA or FTA test.

A VDRL or RPR titre of less than 1 in 16 may be caused by syphilis.

NOTE

The VDRL, RPR or rapid syphilis test may still be negative during the first few weeks after infection with syphilis as the patient has not yet had enough time to form antibodies. The VDRL and RPR tests detect regain antibodies which indicate present syphilis infection while the TPHA, FTA and syphilis rapid tests detect spirichaetal antibodies which indicate syphilis at any time in that person's life.

1-37 How should the results of the on-site RPR card test and syphilis rapid test be interpreted?

If either test is negative the patient does not have syphilis.

1. If the RPR card test is strongly positive the patient most likely has syphilis and treatment should be started. However, a blood specimen must be sent to the laboratory to confirm the diagnosis, and the patient must be seen again 1 week later. Further treatment will depend on the result of the laboratory test. It is important to explain to the patient that the result of the card test needs to be checked with a laboratory test. If the test is weakly positive a blood specimen must still be sent to the laboratory and the patient seen 1 week later. Any treatment will depend on the result of the laboratory test.
2. If the syphilis rapid test is positive the person either has active (untreated) syphilis or was infected in the past and no longer has active disease. The diagnosis of active syphilis must be confirmed or rejected by a VDRL or RPR test. It is advisable that treatment for syphilis be started immediately while waiting for the result of the RPR or VDRL test. A TPHA can be used as a screening test in the same way as the syphilis rapid test.

1-38 What is the treatment of syphilis in pregnancy?

The treatment of choice is penicillin. If the patient is not allergic to penicillin, she is given benzathine penicillin (Bicillin LA or Penilente LA) 2.4 million units intramuscularly weekly for 3 weeks. At each visit 1.2 million units is given into each buttock. This is a painful injection so the importance of completing the full course must be impressed on the patient.

Benzathine penicillin crosses the placenta and also treats the fetus.

If the patient is allergic to penicillin, she is given erythromycin 500 mg 6 hourly orally for 14 days. This may not treat the fetus adequately, however. Tetracycline is contraindicated in pregnancy as it may damage the fetus.

The patient's sexual partner must also be treated.

1-39 How should the results of the rapid HIV test be interpreted?

1. If the rapid HIV test is NEGATIVE, there is a very small chance that the patient is HIV positive. The patient should be informed about the result and given counselling to help her to maintain her negative status.
2. If the rapid HIV test is POSITIVE, a second rapid test should be done with a kit from another manufacturer. If the second test is also positive, then the patient is HIV positive. The patient should be given the result and post-test counselling for an HIV-positive patient should be provided.
3. If the first rapid test is positive and the second negative, the patient's HIV status is uncertain. This information should be given to the patient and blood should be taken and sent to the nearest laboratory for an ELISA test for HIV:
 - If the ELISA test is negative, there is only a very small chance that the patient is HIV positive.
 - If the ELISA test is positive, the patient is HIV positive.

1-40 What should you do if the cervical cytology result is abnormal?

1. A patient whose smear shows an infiltrating cervical carcinoma must immediately be referred to the nearest gynaecological oncology clinic (level 3 hospital). The duration of pregnancy is very important, and this information (determined as accurately as possible) must be available when the unit is phoned.
2. A patient with a smear showing a low grade CIL (cervical intra-epithelial lesion) such as CIN I (cervical intra-epithelial neoplasia), atypia or only condylomatous changes is checked after 9 months, or as recommended on the cytology report.
3. A patient with a smear showing a high grade CIL, such as CIN II or III or atypical condylomatous changes, must get an appointment at the nearest gynaecology or cytology clinic.
4. Abnormal vaginal flora is only treated if the patient is symptomatic.

It is essential to record on the antenatal card the plan that has been decided upon, and to ensure that the patient is fully treated after delivery.

1-41 What should you do if the patient's blood group is Rh negative?

Between 5 and 15% of patients are Rhesus negative (i.e. they do not have the Rhesus D antigen on their red cells). The blood grouping laboratory will look for Rhesus anti-D antibodies in these patients. If the Rh card test was used, blood must be sent to the blood grouping laboratory to confirm the result and look for Rhesus anti-D antibodies.

1. If there are no anti-D antibodies present, the patient is not sensitised. Blood must be taken at 26, 32 and 38 weeks of pregnancy to determine if the patient has developed anti-D antibodies since the first test was done.
2. If anti-D antibodies are present, the patient has been sensitised to the Rhesus D antigen. With an anti-D antibody titre of 1:16 or higher, she must be referred to a centre which specialises in the management of this problem. If the titre is less than 1:16, the titre should be repeated within 2 weeks or as directed by the laboratory.

1-42 What should you do if the ultrasound findings do not agree with the patient's dates?

Between 18 and 22 weeks:

1. If the duration of pregnancy, as suggested by the patient's menstrual dates, falls within the range of the duration of pregnancy as given by the ultrasonographer (usually 3–4 weeks), the dates should be accepted as correct.
2. However, if the dates fall outside the range of the ultrasound assessment, then the dates must be regarded as incorrect.
3. If the ultrasound examination is done in the first trimester (14 weeks or less), the error in determining the gestational age is only one week.

Remember, if the patient is more than 24 weeks pregnant, ultrasonology cannot be used to accurately determine the gestational age.

1-43 What action should you take if an ultrasound examination at 18 to 22 weeks shows a placenta praevia?

In most cases the placenta will move out of the lower segment as pregnancy progresses, as the size of the uterus increases more than the size of the

placenta. Therefore, a follow-up ultrasound examination must be arranged at 32 weeks, where a placenta praevia type II or higher has been diagnosed, to assess whether the placenta is still praevia.

1-44 What should you do if the ultrasound examination shows a possible fetal abnormality?

The patient must be referred to a level 3 hospital for detailed ultrasound evaluation and a decision about further management.

Grading the risk

Once the results of the special investigations have been obtained, all patients must be graded into a risk category. (A list of risk factors and the level of care needed is given in Appendix 1). A few high-risk patients would have already been identified at the first antenatal visit while others will be identified at the second visit.

1-45 What are the risk categories?

There are 3 risk categories:

1. Low (average) risk.
2. Intermediate risk.
3. High risk.

A low-risk patient has no maternal or fetal risk factors present. These patients can receive primary care from a midwife.

An intermediate-risk patient has a problem which requires some, but not continuous, additional care. For example, a grande multipara should be assessed at her first or second visit for medical disorders, and at 34 weeks for an abnormal lie. She also requires additional care during labour and postpartum. She, therefore, is at an increased risk of problems only during part of her pregnancy, labour and puerperium. Most of the antenatal care in these patients can be given by a midwife.

A high-risk patient has a problem which requires continuous additional care. For example, a patient with heart valve disease or a patient with a multiple pregnancy. These patients usually require care by a doctor.

Subsequent visits

General principles:

1. The subsequent visits must be problem oriented.
2. The visits at 28, 34 and 41 weeks are more important visits. At these visits, complications specifically associated with the duration of pregnancy are looked for.
3. From 28 weeks onwards the fetus is viable and the fetal condition must, therefore, be regularly assessed.

1-46 When should a patient return for further antenatal visits?

If a patient books in the first trimester, and is found to be at low risk, her subsequent visits can be arranged as follows:

1. Every 8 weeks until 28 weeks.
2. The next visit is 6 weeks later at 34 weeks.
3. Primigravids are then seen at 36 weeks and multigravidae at 38 weeks. However, multigravidae are also seen again at 36 weeks if a breech presentation was present at 34 weeks.
4. Thereafter primigravidae are seen at 40 and 41 weeks while multigravidae are seen at 41 weeks if they have not yet delivered.
5. In some rural areas it may be necessary to see low-risk patients less often because of the large distances involved. The risk of complications with less frequent visits in these patients is minimal. Visits may be scheduled as follows: after the first visit (combining the booking and second visit), the follow-up visits at 28, 34 and 41 weeks.

1-47 Which patients should have more frequent antenatal visits?

If a complication develops, the risk grading will change. This change must be clearly recorded on the patient's antenatal card. Subsequent visits will now be more frequent, depending on the nature of the risk factor.

Primigravidae, whenever possible, must be seen every 2 weeks from 36 weeks, even if it is only to check the blood pressure and test the urine for protein, because they are a high-risk group for developing pre-eclampsia.

A waiting area (obstetric village), where cheap accommodation is available for patients, provides an ideal solution for some intermediate-risk patients, high-risk patients and the above-mentioned primigravidae, so that they can be seen more regularly.

The visit at 28 weeks

1-48 What important complications of pregnancy should be looked for?

1. Antepartum haemorrhage becomes a very important high-risk factor from 28 weeks.
2. Early signs of pre-eclampsia may now be present for the first time, as it is a problem which develops in the second half of pregnancy. Therefore, the patient must be assessed for proteinuria and a rise in the blood pressure.
3. Cervical changes in a patient who is at high risk for preterm labour, e.g. multiple pregnancy, a history of previous preterm labour, or polyhydramnios.
4. If the symphysis-fundal height measurement is below the 10th centile, assess the patient for causes of poor fundal growth.
5. If the symphysis-fundal height measurement is above the 90th centile, assess the patient for the causes of a uterus larger than dates.
6. Anaemia may be detected for the first time during pregnancy.
7. Diabetes in pregnancy may present now with glycosuria. If so, a random blood glucose concentration must be measured.

1-49 Why is an antepartum haemorrhage a serious sign?

1. Abruptio placenta causes many perinatal deaths.
2. It may also be a warning sign of placenta praevia.

1-50 How should you monitor the fetal condition?

1. All women should be asked about the frequency of fetal movements and warned that they must report immediately if the movements suddenly decrease or stop.
2. If a patient has possible intra-uterine growth restriction or a history of a previous fetal death, then she should count fetal movements once a day from 28 weeks and record them on a fetal movement chart.

The visit at 34 weeks

1-51 Why is the 34 weeks visit important?

1. All the risk factors of importance at 28 weeks (except for preterm labour) are still important and must be excluded.
2. The lie of the fetus is now very important and must be determined. If the presenting part is not cephalic, then an external cephalic version must be attempted at 36 weeks if there are no contraindications. A grande multipara who goes into labour with an abnormal lie is at high risk of rupturing her uterus.
3. Patients who have had a previous caesarean section must be assessed with a view to the safest method of delivery. A patient with a small pelvis, a previous classical caesarean section, as well as other recurrent causes for a caesarean section must be booked for an elective caesarean section at 39 weeks.
4. The patient's breasts must be examined again for flat or inverted nipples, or eczema of the areolae which may impair breastfeeding. Eczema should be treated.
5. If the first HIV screen was negative, it should be repeated around 32 weeks gestation to detect any late infections.

The visit at 41 weeks

1-52 Why is the visit at 41 weeks important?

A patient, whose pregnancy extends beyond 42 weeks, has an increased risk of developing the following complications:

1. Intrapartum fetal distress.
2. Meconium aspiration.
3. Intra-uterine death.

1-53 How should you manage a patient who is 41 weeks pregnant?

1. A patient with a complication such as intra-uterine growth restriction (retardation) or pre-eclampsia must have labour induced.
2. A patient who booked early and was sure of her last menstrual period and where, at the booking visit, the size of the uterus corresponded to the duration of pregnancy by dates must have the labour induced on the day she reaches 42 weeks. The same applies to a patient whose duration of pregnancy was confirmed by ultrasound examination before 24 weeks.
3. A patient who is unsure of her dates, or who booked late, must have an ultrasound examination on the day she reaches 42 weeks to determine the amount of amniotic fluid present:
 - If the amniotic fluid index is 5 or more (or the largest pool of liquor measures 3 cm or more) and the patient reports good fetal movement, she should be reassessed in one weeks time.
 - If the amniotic fluid largest pool of liquor measures less than 3 cm, the pregnancy must be induced.

NOTE

The amniotic fluid index measures the largest vertical pool of liquor in the each of the 4 quadrants of the uterus and adds them together.

It is very important that the above problems are actively looked for at 28, 34 and 41 weeks. It is best to memorise these problems and check them one by one at each visit.

Remember that the commonest cause of being postterm is wrong dates.

1-54 How should the history, clinical findings and results of the special investigations be recorded in low-risk patients?

There are many advantages to a hand-held antenatal card which records all the patient's antenatal information. It is simple, cheap and effective. It is uncommon for patients to lose their records. The clinical record is then always available wherever the patient presents for care. The clinic need only record the patient's personal details such as name, address and age together with the dates of her clinic visits and the result of any special investigations.

On the one side of the card are recorded the patient's personal details, history, estimated gestational age, examination findings, results of the special investigations, plan of management and proposed future family planning. On the other side are recorded all the maternal and fetal observations made during pregnancy.

It is important that all antenatal women have a hand-held antenatal card.

1-55 What topics should you discuss with patients during the health education sessions?

The following topics must be discussed:

1. Danger symptoms and signs.
2. Dangerous habits, e.g. smoking or drinking alcohol.
3. Healthy eating.
4. Family planning.
5. Breastfeeding.
6. Care of the newborn infant.
7. The onset of labour and labour itself must also be included when the patient is a primigravida.
8. Avoiding HIV infection or counselling if HIV positive.

1-56 What symptoms or signs, which may indicate the presence of serious complications, must be discussed with patients?

1. Symptoms and signs that suggest abruption placenta:
 - Vaginal bleeding.
 - Persistent, severe abdominal pain.
 - Decreased fetal movements.
2. Symptoms and signs that suggest pre-eclampsia:
 - Persistent headache.
 - Flashes before the eyes.
 - Sudden swelling of the hands, feet or face.
3. Symptoms and signs that suggest preterm labour:
 - Rupture of the membranes.
 - Regular uterine contractions before the expected date of delivery.

Managing women with HIV infection

1-57 What is HIV infection and AIDS?

AIDS (Acquired Immune Deficiency Syndrome) is a severe chronic illness caused by the human immunodeficiency virus (HIV). Women with HIV infection can remain clinically well for many years before developing signs of the disease. Severe HIV disease is called AIDS. These patients have a damaged immune system and often die of other opportunistic infections such as tuberculosis.

1-58 Is AIDS an important cause of maternal death?

As the HIV epidemic spreads, the number of pregnant women dying of AIDS has increased dramatically. In some countries, such as South Africa, AIDS is now the commonest cause of maternal death. Therefore all pregnant women must be screened for HIV infection.

All pregnant women must be screened for HIV infection as AIDS is the commonest cause of maternal death in South Africa.

1-59 Does pregnancy increase the risk of progression from asymptomatic HIV infection to AIDS?

Pregnancy appears to have little or no effect on the progression from asymptomatic to symptomatic HIV infection. However, in women who already have symptomatic HIV infection, pregnancy may lead to a more rapid progression to AIDS.

1-60 How is the severity of HIV infection classified?

The severity and progression of HIV infection during pregnancy can be monitored by:

Assessing the clinical stage of the disease

Stage 1: Clinically well. Stage 2: Mild clinical problems. Stage 3: Moderate clinical problems. Stage 4: Severe clinical problems (i.e. AIDS).

Measuring the CD4 count in the blood A falling CD4 count is an important marker of progression in HIV infection. It is an indicator of the degree of damage to the immune system. The normal adult CD4 count is 700 to 1100 cells/mm³. A CD4 count equal or below 350 cells/mm³ indicates severe damage to the immune system.

The CD4 count is an important marker of the severity and progression of HIV infection during pregnancy.

1-61 What clinical signs suggest stage 1 and 2 HIV infection?

Persistent generalised lymphadenopathy is the only clinical sign of stage 1 HIV infection.

Signs of stage 2 HIV infection include:

- Repeated or chronic mouth or genital ulcers.
- Extensive skin rashes.

- Repeated upper respiratory tract infections such as otitis media or sinusitis.
- Herpes zoster (shingles).

1-62 What are important features suggesting stage 3 or 4 HIV infection?

Features of stage 3 HIV infection include:

- Unexplained weight loss.
- Oral candidiasis (thrush).
- Cough, fever and night sweats suggesting pulmonary tuberculosis.
- Cough, fever and shortness of breath suggesting bacterial pneumonia.
- Chronic diarrhoea or unexplained fever for more than 1 month.
- Pulmonary tuberculosis.

Features of stage 4 HIV infection include:

- Severe weight loss.
- Severe or repeated bacterial infections, especially pneumonia.
- Severe HIV-associated infections such as oesophageal candidiasis (which presents with difficulty swallowing) and Pneumocystis pneumonia (which presents with cough, fever and shortness of breath).
- Malignancies such as Kaposi's sarcoma.
- Extrapulmonary tuberculosis (TB).

1-63 How should pregnant women with a positive HIV screening test be managed?

It is very important to identify women with HIV infection as soon as possible in pregnancy so that they can be carefully assessed and their management can be planned. The HIV management should be integrated into the rest of the antenatal care. All women with a positive HIV screening test must have their CD4 count determined as soon as the HIV screening result is obtained.

Pregnant women with HIV infection need either antiretroviral prophylaxis or treatment.

Determine and note the clinical stage of the disease on the antenatal record.

All HIV-positive women must have a CD4 count.

1-64 What are the indications for antiretroviral prophylaxis in pregnancy?

All pregnant women who are HIV positive but appear clinically well with a CD4 count above 350 need antiretroviral (ARV) prophylaxis only.

All pregnant women who are HIV positive should receive either antiretroviral prophylaxis or treatment.

1-65 What is antiretroviral prophylaxis?

Antiretroviral prophylaxis aims at reducing the risk of the mother infecting her fetus and newborn infant with HIV (prevention of mother-to-child transmission or PMTCT). It is not aimed at treating the mother's HIV infection and therefore is given to HIV positive women who are clinically well with a CD4 count above 350 cells/mm³. With prophylaxis the women stop their ARVs once they have stopped breastfeeding and there is no further risk of mother-to-child transmission (WHO option B). ARV prophylaxis should be started at 14 weeks or as soon as possible thereafter. It will reduce the risk of HIV transmission from mother to infant to 2%, compared to 30% without prophylaxis.

For prophylaxis a fixed dose combination (FDC) pill is taken daily, usually at bedtime.

NOTE

WHO option A, which is no longer used in South Africa, consists of Zidovudine (AZT) 300 mg orally twice daily started at 14 weeks gestation. A single dose of nevirapine 200mg is given to the mother at the onset of labour and AZT 300mg 3 hourly is given during labour. In addition, a single dose of Truvada, a combination of tenofovir (TDF) and emtricitabine (FTC), must be given to the mother during or immediately after labour to prevent nevirapine resistance in the mother. Daily nevirapine is started in the infant. This regime is known as dual therapy and will reduce the risk of HIV transmission from mother to infant to 2%, compared to 30% without prophylaxis. Truvada is the trade name of the combination of TDF and FTC. It is given to prevent nevirapine resistance in the mother.

Antiretroviral prophylaxis can reduce the risk of perinatal HIV transmission to 2%.

1-66 What are the indications for antiretroviral treatment in pregnancy?

The indications for ARV antiretroviral treatment (ART) instead of ARV prophylaxis are any of the following:

- Clinical signs of stage 3 or 4 HIV infection.
- A CD4 count equal or below 350 cells/mm³
- Tuberculosis.

Therefore, women with clinical signs of stage 3 or 4 HIV disease need antiretroviral treatment even if their CD4 count has not yet dropped to below 350. The difference between ARV prophylaxis and treatment is that women on treatment continue their ARVs for life and do not stop once breastfeeding is completed. In future all pregnant women who are HIV positive will probably be given treatment with ARVs for life (WHO option B+).

1-67 What is antiretroviral treatment?

The aim of antiretroviral treatment is to lower the viral load and allow the immune system to recover. This will both reduce the risk of HIV transmission to the infant and treat the mother's HIV infection. ARV treatment consists of taking TDF, FTC and EFV as a FDC tablet daily. Patients on antiretroviral treatment are not also given antiretroviral prophylaxis as antiretroviral treatment alone provides excellent prophylaxis. The use of FDC during pregnancy is the same for both prophylaxis and treatment.

Women who are already on ARV treatment when they book for antenatal care should continue on their ARV treatment during the pregnancy. If not already on FDC, their ARV's may be changed to FDC by a special HIV clinic.

A fixed dose combination of antiretroviral drugs is used for HIV prophylaxis and treatment during pregnancy.

1-68 Can an HIV-positive woman be cared for in a primary-care clinic?

Most women who are HIV positive are clinically well with a normal pregnancy. Others may only have minor problems (stage 1 or 2). These women can usually be cared for in a primary-care clinic throughout their

pregnancy, labour, and puerperium, provided they remain well and their pregnancy is normal. Women with a pregnancy complication should be referred to hospital as would be done with HIV-negative patients. Women with severe (stage 3 or 4) HIV-related problems or severe treatment side effects will need to be referred to a special HIV clinic or hospital.

Most HIV-positive women can be managed at a primary-care clinic during pregnancy.

1-69 How are pregnant women with HIV infection managed at a primary-care clinic?

The management of pregnant women with HIV infection is very similar to that of non-pregnant adults with HIV infection. The most important step is to identify those pregnant women who are HIV positive.

The principles of management of pregnant women with HIV infection at a primary-care clinic are:

- Make the diagnosis of HIV infection by offering HIV screening to all pregnant women at the start of their antenatal care.
- Assess the CD4 count in all HIV-positive women as soon as their positive HIV status is known.
- Screen for clinical signs of HIV infection and clinical staging at each antenatal visit.
- Screen for symptoms of TB.
- Good diet. Nutritional support may be needed.
- Emotional support and counselling.
- Prevention of mother-to-child transmission (PMTCT) of HIV.
- Start ARV (antiretroviral) prophylaxis or treatment when indicated.
- Early referral if there are pregnancy or HIV complications.

1-70 What preparation is needed for antiretroviral treatment?

Preparing a patient to start ARV treatment is very important. This requires education, counselling and social assessment before ARV treatment can be started. These patients must have regular clinic attendance and must learn about their illness and the importance of excellent adherence (taking their ARV drugs at the correct time every day). They also need to know the side

effects of ARV drugs and how to recognise them. Careful general examination and some blood tests are also needed before starting ARV treatment. ARV management should start as soon as possible, preferably within a few days. It usually takes 2 weeks to prepare a patient for treatment.

1-71 How should pregnant women on antiretroviral treatment be managed?

The national drug protocol using a FDC tablet should be followed. It is very important that staff at the antenatal clinic are trained to manage women with HIV infection. They should work together with the local antiretroviral (ARV) clinic or HIV service of the local hospital.

1-72 What drugs are used in the fixed dose combination pill for starting antiretroviral treatment during pregnancy?

A fixed dose combination regimen of three drugs is usually used as first line treatment in South Africa. The FDC consists of tenofovir (TDF) 300 mg, emtricitabine (FTC) 200 mg and efavirenz (EFV) 600 mg.

This is the current national first-line standard drug combination used during pregnancy. Zidovudine (AZT) may replace TDF while emtricitabine (FTC) may replace 3TC if necessary.

1-73 What are the side effects of antiretroviral drugs?

Pregnant women on antiretroviral prophylaxis or treatment may experience side effects to the ARV drugs. These are usually mild and occur during the first six weeks of treatment. However, side effects may occur at any time that patients are taking antiretroviral treatment. It is important that the staff at primary-care clinics are aware of these side effects and that they ask for symptoms and look for signs at each clinic visit. Side effects with antiretroviral treatment are more common than with antiretroviral prophylaxis during pregnancy.

Common early side effects during the first few weeks of starting ARV antiretroviral drugs treatment include:

- Lethargy, tiredness and headaches
- Nausea, vomiting and diarrhoea
- Muscle pains and weakness

These mild side effects usually disappear on their own. They can be treated symptomatically. It is important that antiretroviral treatment is continued even if there are mild side effects.

EFV may cause insomnia (cannot sleep), abnormal dreams and rarely psychiatric symptoms.

More severe side effects, which can be fatal, include:

- TDF may cause decreased renal function.
- NVP may cause severe skin rashes. All patients with severe skin rashes must be referred urgently to the HIV clinic.
- AZT may suppress the bone marrow, causing anaemia. There may also be a reduction in the white cell and platelet counts.
- Hepatitis can be caused by all antiretroviral drugs, but especially by NVP.
- Lactic acidosis is a late but serious side effect, especially with stavudine (d4T). It presents with weight loss, tiredness, nausea, vomiting, abdominal pain and shortness of breath in patients who have been well on antiretroviral treatment for a few months.

Staff at primary-care clinics must be aware and look out for these very important side effects.

1-74 Is HIV/TB co-infection common in pregnancy?

Tuberculosis (TB) is common in patients with HIV who have a weakened immune system. Therefore co-infection with both HIV and TB bacilli is common during pregnancy in communities with a high prevalence of HIV and TB.

Symptomatic screening for TB must be done at each visit by weighing the patient, to check for weight loss, and by asking her about a chronic cough, fever or profuse night sweats. If any one of these are present further investigations for TB are required.

TB is treated with four drugs (rifampicin, isoniazid, pyrazinamide and ethambutol) which may interact and increase the adverse effects of

antiretroviral ARV drugs. Treatment of both HIV and tuberculosis should be integrated with routine antenatal care whenever possible.

Case study 1

A 36 year old gravida 4 para 3 patient presents at her first antenatal clinic visit. She does not know the date of her last menstrual period. The patient says that she had hypertension in her last 2 pregnancies. The symphysis-fundus height measurement suggests a 32 week pregnancy. At her second visit, the report of the routine cervical smear states that she has a low grade cervical intra-epithelial lesion.

1. Why is her past obstetric history important?

Because hypertension in a previous pregnancy places her at high risk of hypertension again in this pregnancy. She must be carefully examined for hypertension and proteinuria at this visit and at each subsequent visit. This case stresses the importance of a careful history at the booking visit.

2. How accurate is the symphysis-fundus height measurement in determining that the pregnancy is of 32 weeks duration?

This is the most accurate clinical method to determine the size of the uterus from 18 weeks gestation. If the uterine growth, as determined by symphysis-fundus measurement, follows the curve on the antenatal card, the gestational age as determined at the first visit is confirmed.

3. Why would an ultrasound examination not be helpful in determining the gestational age?

Ultrasonology is accurate in determining the gestational age only up to 24 weeks. Thereafter, the range of error is virtually the same as that of a clinical examination.

4. What should you do about the result of the cervical smear?

The cervical smear must be repeated after 9 months. It is important to write the result in the antenatal record and to indicate what plan of management has been decided upon.

Case study 2

At booking a patient has a positive VDRL test with a titre of 1:4. She has had no illnesses or medical treatment during the past year. By dates and abdominal palpation she is 26 weeks pregnant.

1. What does the result of this patient's VDRL test indicate?

The positive VDRL test indicates that the patient may have syphilis. However, the titre is below 1:16 and, therefore, a definite diagnosis of syphilis cannot be made without a further blood test.

2. What further test is needed to confirm or exclude a diagnosis of syphilis?

If possible, the patient must have a TPHA or FTA or rapid syphilis test. A positive result of any of these tests will confirm the diagnosis of syphilis. If these tests are not available, the patient must be treated for syphilis.

3. Why is the fetus at risk of congenital syphilis?

Because the spirochaetes that cause syphilis may cross the placenta and infect the fetus.

4. What treatment is required if the patient has syphilis?

The patient should be given 2,4 million units of benzathine penicillin (Bicillin LA or Penilente LA) intramuscularly weekly for 3 weeks. Half of the dose is given into each buttock. Benzathine penicillin will cross the placenta and also treat the fetus.

5. What other medical conditions is this patient likely to suffer from?

She may have other sexually transmitted diseases such as HIV.

Case study 3

A healthy primigravid patient of 18 years booked for antenatal care at 22 weeks pregnant. Her rapid syphilis and HIV tests were negative. Her Rh blood group is positive according the Rh card test. She is classified as at low risk for problems during her pregnancy.

1. What is the best time for a pregnant woman to attend an antenatal care clinic for the first time?

If possible, all pregnant women should book for antenatal care within the first 12 weeks. The duration of pregnancy can then be confirmed with reasonable accuracy on physical examination, medical problems can be diagnosed early, and screening tests can be done as soon as possible.

2. When should this patient return for her next antenatal visit?

She should attend at 28 weeks.

3. What important complications should be looked for in this patient at her 28 week visit?

Anaemia, early signs of pre-eclampsia, a uterus smaller than expected (suggesting intra-uterine growth restriction), or a uterus larger than expected (suggesting multiple pregnancy). A history of antepartum haemorrhage should also be asked for.

4. When should she attend antenatal clinic in the last trimester if she and her fetus remain normal?

The next visit should be at 34 weeks, and then every 2 weeks until 41 weeks.

Case study 4

A 24 year old gravida 2 para 1 attends the booking antenatal clinic and is seen by a midwife. The previous obstetric history reveals that she had a caesarean section at term because of poor progress in labour. She is sure of her last menstrual period and is 14 weeks pregnant by dates. On abdominal palpation the height of the uterine fundus is halfway between the symphysis pubis and the umbilicus.

1. What further important information must be obtained about the previous caesarean section?

The exact indication for the caesarean section must be found in the patient's hospital notes. In addition, the type of uterine incision made must be established, i.e. whether it was a transverse lower segment or a vertical incision.

2. Why is it important to obtain this additional information?

If the patient had a caesarean section for a non-recurring cause and she had a transverse lower segment incision, she may be allowed a trial of labour.

3. In which risk category would you place this patient?

She should be placed in the intermediate category.

4. How must you plan this patient's antenatal care?

Her next visit must be arranged at a hospital. If possible, the hospital where she had the caesarean section so that the required information may be obtained from her folder. Then she may continue to receive her antenatal care from the midwife at the clinic until 36 weeks gestation. From then on the patient must again attend the hospital antenatal clinic where the decision about the method of delivery will be made.

5. Which of the two estimations of the duration of pregnancy is the correct one?

A fundal height measurement midway between the symphysis pubis and the umbilicus suggests a gestational age of 16 weeks. According to her dates, the patient is 14 weeks pregnant. As the difference between these two estimations is less than 3 weeks, the duration of pregnancy as calculated from the patient's dates must be accepted as the correct one.

NAME: _____	EXAMINATION *		
FOLDER NO.: _____	Date	D D M M Y Y	
BIRTH DATE: _____	Height _____	Weight _____	
CLINIC/DOCTOR: _____	BP _____	Hb _____	
TELEPHONE NO.: _____	Urine _____	General _____	
HISTORY* Obstetric history L = Live ILD = intra-uterine death END = early neonatal death LND = late neonatal death ID = infant death			
Year (weeks)	Delivery	Weight	Sex ↓ Complications
Description of complications _____			
Age _____	P _____	G _____	Vaginal Examination
Medical and general history _____			
Cervix _____			
Uterus _____			
Abdomen _____ SF- Measurement _____			
Other _____			
NAME: _____			
SPECIAL INVESTIGATIONS * VDRL _____ TPHA _____ FTA - Abs _____ Rx received 1st _____ 2nd _____ 3rd _____ Bloodgroup and Rh _____ Cytology _____ MSU _____ RVD Test accepted: Yes No Precautions: Yes No Other _____			
SONAR Date D D M M Y Y BPD _____ mm _____ weeks FL _____ mm _____ weeks Placenta _____ Other _____			
EDD according to: dates / sonar / both / uncertain Day Day Month Month Year Year			
Future family planning _____			
<small>*Note problems from history, examination & special investigations on problem list</small>			
Smoking: Yes No		Counselling <input type="checkbox"/>	

Figure 1-1: The front of an antenatal record card

Figure 1-2: The back of an antenatal record card

Clinic Checklist – Classifying (first) visit

Name of patient _____

Clinic record number | | | | | | |

Address _____

Telephone _____

Cell _____

Cell _____

INSTRUCTIONS: Answer all the following questions by placing a cross mark in the corresponding box

Obstetric History

1. Previous stillbirth or neonatal loss?
2. History of three or more consecutive spontaneous abortions
3. Birth weight of last baby < 2500g?
4. Birth weight of last baby > 4500g?
5. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?
6. Previous surgery on reproductive tract (Caesarean section, myomectomy, cone biopsy, cervical cerclage.)

No	Yes

Current pregnancy

7. Diagnosed or suspected multiple pregnancy
8. Age < 16 years
9. Age > 40 years
10. Isoimmunisation Rh (-) in current or previous pregnancy
11. Vaginal bleeding
12. Pelvic mass
13. Diastolic blood pressure 90 mmHg or more at booking
14. AIDS

General medical

15. Diabetes mellitus on insulin or oral hypoglycaemic treatment
16. Cardiac disease
17. Renal disease
18. Epilepsy
19. Asthmatic on medication
20. Tuberculosis
21. Known substance abuse (including heavy alcohol drinking)
22. Any other severe medical disease or condition

Please specify _____

A yes to any ONE of the above questions (i.e. ONE shaded box marked with a cross) means that the woman is not eligible for the basic component of antenatal care.

Is the woman eligible (circle)

Yes

No

If NO, she is referred to _____

Date _____ Name _____ Signature _____
(Staff responsible for antenatal care)

Figure 1-3: Clinic checklist

Clinic Checklist:Follow-up visits (Back page of first visit checklist)

VISITS					
	1	2	3	4	5
First visit for all women at first contact with clinics, regardless of gestational age. If first visit later than recommended, carry out activities up to that time					
DATE :					
Approximate Gest. Age.	(20)	(26-28)	(32)	(38)	
Classifying form which indicates eligibility for BANC					
History taken					
Clinical examination					
Estimated date of delivery calculated					
Blood pressure taken					
Maternal height/weight					
Haemoglobin test					
RPR performed					
Urine tested					
Rapid Rh performed					
Counselled and voluntary testing for HIV					
Tetanus toxoid given					
Iron and folate supplementation provided					
Calcium supplementation provided					
Information for emergencies given					
Antenatal card completed and given to woman					
AZT and NVP given (if required) – Check each visit if AZT sufficient					
Clinical examination for anaemia					
Urine test for protein					
Uterus measured for excessive growth (twins), poor growth (IUGR)					
Instructions for delivery/transport to institution					
Recommendations for lactation and contraception					
Detection of breech presentation and referral					
Complete antenatal card and remind woman to bring it when in labour					
Give follow-up visit date for 41 weeks at referring institution					
Initials of staff member responsible					

Figure 1-4: Back page of clinic checklist

Skills workshop 1A: General examination at the first antenatal visit

Objectives

When you have completed this skills workshop you should be able to:

- Take an adequate history.
- Perform a good general examination.
- Test the patient's urine.
- Perform and interpret a pregnancy test.

History taking

The purpose of taking a history is to assess the past and present obstetrical, medical and surgical problems in order to detect risk factors for the patient and her fetus.

A The last normal menstrual period (LMP)

1. Does she have a normal and regular menstrual cycle?
2. When did she last have a normal menstrual period?

It may be difficult to establish the LMP when she has an irregular cycle.

If the patient is uncertain of her dates, it is often helpful to relate the onset of pregnancy to some special event, e.g. Christmas or school holidays. For example "How many periods have you had since your birthday?", or "How many periods had you missed before New Year?"

The expected date of delivery (EDD) must now be estimated as accurately as possible. A quick estimate can be made by taking the date of the LMP and adding 9 months and 1 week. Therefore, if the LMP was on 2-2-09, the EDD will be on 9-11-09. If the LMP is 27-10-08, the EDD will be 3-8-09.

B Past obstetric history

It is important to know how many pregnancies the patient has lost. Patients often forget about miscarriages and ectopic pregnancies, and may also not mention previous pregnancies from another husband or boyfriend. Questions which need to be asked are therefore:

How many times have you been pregnant? Ask specifically about miscarriages and ectopic pregnancies.

How many children do you have? This can bring to light the fact that she has had twins.

How many children do you have who are alive? If a child has died, one needs to know approximately at what age the child died, and the cause of death, e.g. "died at 15 months from diarrhoea". If the death occurred before delivery or during the neonatal period (first 28 days), information about the cause of death is of particular importance. Approximate birth weights of previous children, and the approximate period of gestation, if the infant was small or preterm, are useful. Low birth weight suggests either growth restriction or preterm delivery, and heavy infants should alert one to the possibility of maternal diabetes.

Were you well during your previous pregnancies? In addition, asking about any episodes of hospitalisation can be helpful.

How long were you in labour? It is important to know if she has had a long labour, as this may indicate cephalopelvic disproportion.

The type of delivery is important. Any form of assisted delivery, including a caesarean section, suggests that there may have been cephalopelvic disproportion. The patient should always be asked if she knows the reason for having had a caesarean section. Information about the type of incision made in the uterus must be obtained from the hospital where the patient had her caesarean section. A history of impacted shoulders is important as it suggests that the infant was very large.

A retained placenta or postpartum haemorrhage in previous pregnancies should be asked for specifically.

All these findings should be recorded briefly on the antenatal clinic record.

HISTORY*						L = Live IUD = intra-uterine death END = early neonatal death LND = late neonatal death ID = infant death																																								
Obstetric history																																														
<table border="1"> <thead> <tr> <th>Year</th><th>Gestation (weeks)</th><th>Delivery</th><th>Weight</th><th>Sex</th><th>Complications</th></tr> </thead> <tbody> <tr> <td>92</td><td>40</td><td>N</td><td>3 200</td><td>F</td><td>L</td></tr> <tr> <td>98</td><td>36</td><td>C/S</td><td>2 000</td><td>M</td><td>IUD</td></tr> <tr> <td>03</td><td>38</td><td>N</td><td>2 900</td><td>F</td><td>L</td></tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>					Year	Gestation (weeks)	Delivery	Weight	Sex	Complications	92	40	N	3 200	F	L	98	36	C/S	2 000	M	IUD	03	38	N	2 900	F	L																		
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03	38	N	2 900	F	L																																									
Description of complications																																														

Figure 1A-1: Recording past obstetric history

C Medical history

Patients must be specifically asked about diabetes, epilepsy, hypertension, renal disease, heart valve disease and tuberculosis. Also ask about any other illnesses which she may have had. Asking about allergies and medication often brings to light a problem which the patient may have forgotten, or thought not to be of significance. Always ask whether she has ever had an operation or has been admitted to hospital and, if so, where and why.

Any abnormal findings in the medical history should be recorded, with a brief comment, on the antenatal record.

D Family planning

The patient's family planning needs and wishes should be discussed at the first antenatal visit. She (and her consort) should be encouraged to plan the number and spacing of their children. The contraceptive methods used should also be in keeping with these plans. The patient's wishes should be respected. The outcome of these discussions should be recorded on the antenatal record.

Examination of the patient

E General examination

The following should be assessed:

1. **Height** – measured in cm. This does not require special equipment. A tape measure stuck to the wall, or a wall marked at 1 cm intervals is adequate. The patient should not wear shoes when her height is measured.
2. **Weight** – measured in kilograms. The patient should only wear light clothing while her weight (mass) is being measured. The scale should be periodically checked for accuracy, and if necessary re-calibrated. Latest research indicates that poor weight gain, no weight gain or excessive weight gain during pregnancy is not important. Worldwide there is a swing away from weighing patients except at the first antenatal visit.
3. **General appearance:**
 - Is the patient thin or overweight?
 - Is there evidence of recent weight loss?
 - The presence of pallor, oedema, jaundice and enlarged lymph nodes should be specifically looked for.

F Examination of the thyroid gland

This can be difficult when the patient has a short, thick neck, or when she is obese. Look for an obviously enlarged thyroid gland (a goitre). The patient should be referred for further investigation when there is obvious enlargement of the thyroid, the thyroid feels nodular or a single nodule can be felt. A normal thyroid gland is usually slightly enlarged during pregnancy.

G Examination of the breasts

The patient must be undressed in order for the breasts to be examined properly. The breasts should be examined with the patient both sitting and lying on her back, with her hands above her head.

Look: There may be obvious gross abnormalities. Particularly look for any distortion of the breasts or nipples. The nipples should be specifically examined with regard to their position and deformity (if any), discharge, and whether or not they are inverted. Note any eczema of the areola.

Feel: Feel for lumps, using the flat hand rather than the fingers.

H Examination of the lymph nodes

When the thyroid is examined, the neck should also be thoroughly examined for enlarged lymph nodes. The areas above the clavicles and behind the ears

must be palpated. The axillae and inguinal areas should also be examined for enlarged lymph nodes.

Patients with AIDS usually have enlarged lymph nodes in all these areas.

I Examination of the chest

The patient must be undressed. Look for any of the following signs:

1. Any deformities or scars.
2. Any abnormality of the spine.
3. Any difficulty breathing (dyspnoea).

J Examination of the cardiovascular system

1. Pulse: The rate is important. A rapid heart rate is almost always an indication that the patient is anxious or ill.
2. Blood pressure.

Testing the patient's urine

Urine is most conveniently tested using reagent strips. Some strips will measure pH, glucose, ketones, protein and blood (e.g. Lenstrip-5) while others will also measure bilirubin, specific gravity, urobilinogen, nitrite and leucocytes (e.g. Multistix and Combi-9 Test). However, measuring glucose and protein are most important and, therefore, only glucose and protein (e.g. Uristix) need to be measured in routine antenatal screening. This is the cheapest method. The cost can be reduced further by cutting the strips in two, longitudinally.

The strips should be kept in their containers, away from direct sunlight, and at a temperature of less than 30 °C. A cool dry cupboard is satisfactory. The strips should only be removed from their containers one at a time immediately before use, and the container closed immediately.

K Procedure for testing urine

1. The patient should pass a fresh specimen of urine. If the specimen is more than 1 hour old the test results may be unreliable.
2. The specimen should be collected in a clean, dry container.
3. Dip the reagent strip in the urine so that all the reagent areas are covered, and then remove it immediately. If the strip is left in the urine, the reagents dissolve out of the strip, giving a false reading.
4. Draw the edge of the reagent strip across the edge of the urine container to remove excess urine, and hold the strip horizontally.
5. Hold the strip close to the colour chart on the container label (but not touching it). It is important to compare the colours of the test strip with those on the chart at the correct times. Most of the test results are read between 30 and 60 seconds after dipping the strip in urine:
 - Lenstip-5: All the tests are read after 30–60 seconds.
 - Multistix: The times for reading the individual tests are on the chart.
 - Combi-9: All the tests are read after 60 seconds.

After 2 minutes the colours on the reagent strips no longer give a reliable result.

The patient's urine should be tested at every antenatal visit, and the results recorded on the antenatal chart. Proteinuria of 1+ or more is abnormal while glycosuria must be investigated further.

Doing a pregnancy test

L Indications for a pregnancy test

This test is usually done when a patient has missed one or more menstrual periods and when, on clinical examination, one is uncertain whether or not she is pregnant.

The test is based on the detection of human chorionic gonadotrophin in the patient's urine.

The earliest that the test can be expected to be positive is 10 days after conception. The test will be positive by the time a pregnant woman first

misses her period. If the test is negative and the woman has not missed her period yet, the test should be repeated after 48 hours.

M Storage of test ‘kit’

The test which is described in this unit is the U-TEST β -hCG STRIP FOIL. If another pregnancy test is used, the method of doing the test and reading the results must be carefully studied in the instruction booklet. All these kits can be stored at room temperature. However, do not expose to direct sunlight, moisture or heat.

N Method of performing a pregnancy test

The patient should bring a fresh urine specimen.

1. Open the foil rapper and remove the test strip.
2. Hold the blue end of the test strip so that the blue arrow points downwards. Dip the test strip into the urine, as far as the point of the arrow, for 5 seconds.
3. Place the test strip on a flat surface and read after 30 seconds. The result is not reliable if the test strip is read more than 10 minutes after it was dipped into the urine.

O Reading the result of the pregnancy test

1. **Negative** if only the control band nearest the upper blue part of the test strip becomes pink.
2. **Positive** if two pink bands are visible. Between the control band and the blue part of the test strip another pink band is seen.
3. **Uncertain** if no pink bands are seen. Either the test was not performed correctly or the test strip is damaged. Repeat the test with another test strip.

Skills workshop 1B: Examination of the abdomen in pregnancy

Objectives

When you have completed this skills workshop you should be able to:

- Determine the gestational age from the size of the uterus.
- Measure the symphysis-fundus height.
- Assess the lie and the presentation of the fetus.
- Assess the amount of liquor present.
- Listen to the fetal heart.
- Assess fetal movements.
- Assess the state of fetal wellbeing.

General examination of the abdomen

There are 2 main parts to the examination of the abdomen:

1. General examination of the abdomen.
2. Examination of the uterus and the fetus.

A Preparation of the patient for examination

1. The patient should have an empty bladder.
2. She should lie comfortably on her back with a pillow under her head. She should not lie slightly turned to the side, as is needed when the blood pressure is being taken.

B General appearance of the abdomen

The following should be specifically looked for and noted:

1. The presence of obesity.
2. The presence or absence of scars. When a scar is seen the reason for it should be specifically asked for (e.g. what operation did you have?), if this has not already become clear from the history.
3. The apparent size and shape of the uterus.
4. Any other abnormalities.

C Palpation of the abdomen

1. The liver, spleen and kidneys must be specifically palpated (felt) for.
2. Any other abdominal mass should be noted.
3. The presence of an enlarged organ, or a mass, should be reported to the responsible doctor, and the patient should then be assessed by the doctor.

Examination of the uterus and the fetus

D Palpation of the uterus

1. Check whether the uterus is lying in the midline of the abdomen. Sometimes it is rotated to either the right or the left.
2. Feel the wall of the uterus for irregularities. An irregular uterine wall suggests either:
 - The presence of myomas (fibroids) which usually enlarge during pregnancy and may become painful.
 - A congenital abnormality such as a bicornuate uterus.

E Determining the size of the uterus before 18 weeks gestation

1. Anatomical landmarks are used, i.e. the symphysis pubis and the umbilicus.
2. Gently palpate the abdomen with the left hand to determine the height of the fundus of the uterus:
 - If the fundus is palpable just above the symphysis pubis, the gestational age is probably 12 weeks.
 - If the fundus reaches halfway between the symphysis and the umbilicus, the gestational age is probably 16 weeks.
 - If the fundus is at the same height as the umbilicus, the gestational age is probably 22 weeks (one finger under the umbilicus = 20 weeks and one finger above the umbilicus = 24 weeks).

F Determining the height of the fundus from 18 weeks gestation

The symphysis-fundus height should be measured as follows:

1. **Feel for the fundus of the uterus.** This is done by starting to gently palpate from the lower end of the sternum. Continue to palpate down the abdomen until the fundus is reached. When the highest part of the fundus has been identified, mark the skin at this point with a pen. If the uterus is rotated away from the midline, the highest point of the uterus will not be in the midline but will be to the left or right of the midline. Therefore, also palpate away from the midline to make sure that you mark the highest point at which the fundus can be palpated. Do not move the fundus into the midline before marking the highest point.
2. **Measure the symphysis-fundus (s-f) height.** Having marked the fundal height, hold the end of the tape measure at the top of the symphysis pubis. Lay the tape measure over the curve of the uterus to the point marking the top of the uterus. The tape measure must not be stretched while doing the measurement. Measure this distance in centimetres from the symphysis pubis to the top of the fundus. This is the symphysis-fundus height.
3. If the uterus does not lie in the midline but, for example, lies to the right, then the distance to the highest point of the uterus must still be measured without moving the uterus into the midline.

Having determined the height of the fundus, you need to assess whether the height of the fundus corresponds to the patient's dates, and to the size of the fetus. From 18 weeks, the S-F height must be plotted on the SF growth curve to determine the gestational age. This method is, therefore, only used once the fundal height has reached 18 weeks. In other words when the S-F height has reached two fingers width under the umbilicus.

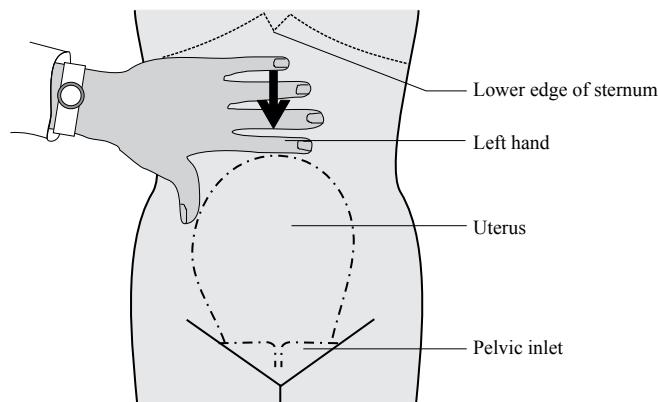


Figure 1B-1: Determining the fundal height

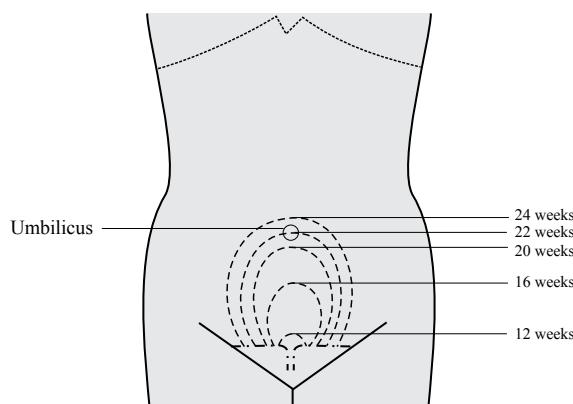


Figure 1B-2: Determining the uterine size before 24 weeks

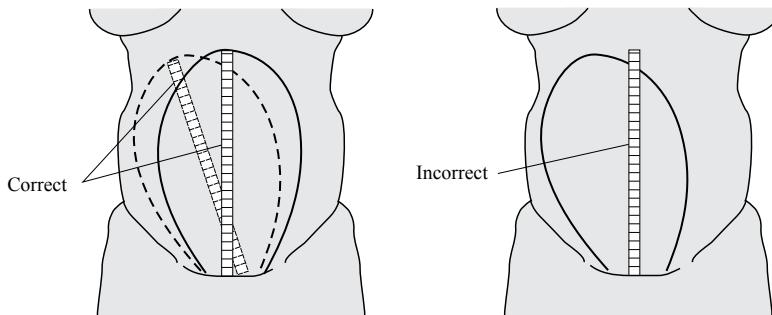


Figure 1B-3: Measuring the symphysis-fundus height

G Palpation of the fetus

The lie and presenting part of the fetus only becomes important when the gestational age reaches 34 weeks.

The following must be determined:

1. **The lie of the fetus.** This is the relationship of the long axis of the fetus to that of the mother. The lie may be longitudinal, transverse, or oblique.
2. **The presentation of the fetus.** This is determined by the presenting part:
 - If there is a breech, it is a breech presentation.
 - If there is a head, it is a cephalic presentation.
 - If no presenting part can be felt, it is a transverse or oblique lie.
3. **The position of the back of the fetus.** This refers to whether the back of the fetus is on the left or right side of the uterus, and will assist in determining the position of the presenting part.

H Methods of palpation

There are 4 specific steps for palpating the fetus. These are performed systematically. With the mother lying comfortably on her back, the examiner faces the patient for the first 3 steps, and faces towards her feet for the fourth.

1. **First step.** Having established the height of the fundus, the fundus itself is gently palpated with the fingers of both hands, in order to discover which pole of the fetus (breech or head) is present. The head feels hard and round,

and is easily movable and ballotable. The breech feels soft, triangular and continuous with the body.

2. **Second step.** The hands are now placed on the sides of the abdomen. On one side there is the smooth, firm curve of the back of the fetus, and on the other side the rather knobbly feel of the fetal limbs. It is often difficult to feel the fetus well when the patient is obese, when there is a lot of liquor or when the uterus is tight, as in some primigravidas.
3. **Third step.** The examiner grasps the lower portion of the abdomen, just above the symphysis pubis, between the thumb and fingers of one hand. The objective is to feel for the presenting part of the fetus and to decide whether the presenting part is loose above the pelvis or fixed in the pelvis. If the head is loose above the pelvis, it can be easily moved and balloted. The head and breech are differentiated in the same way as in the first step.
4. **Fourth step.** The objective of the step is to determine the amount of head palpable above the pelvic brim, if there is a cephalic presentation. The examiner faces the patient's feet, and with the tips of the middle 3 fingers palpates deeply in the pelvic inlet. In this way the head can usually be readily palpated, unless it is already deeply in the pelvis. The amount of the head palpable above the pelvic brim can also be determined.

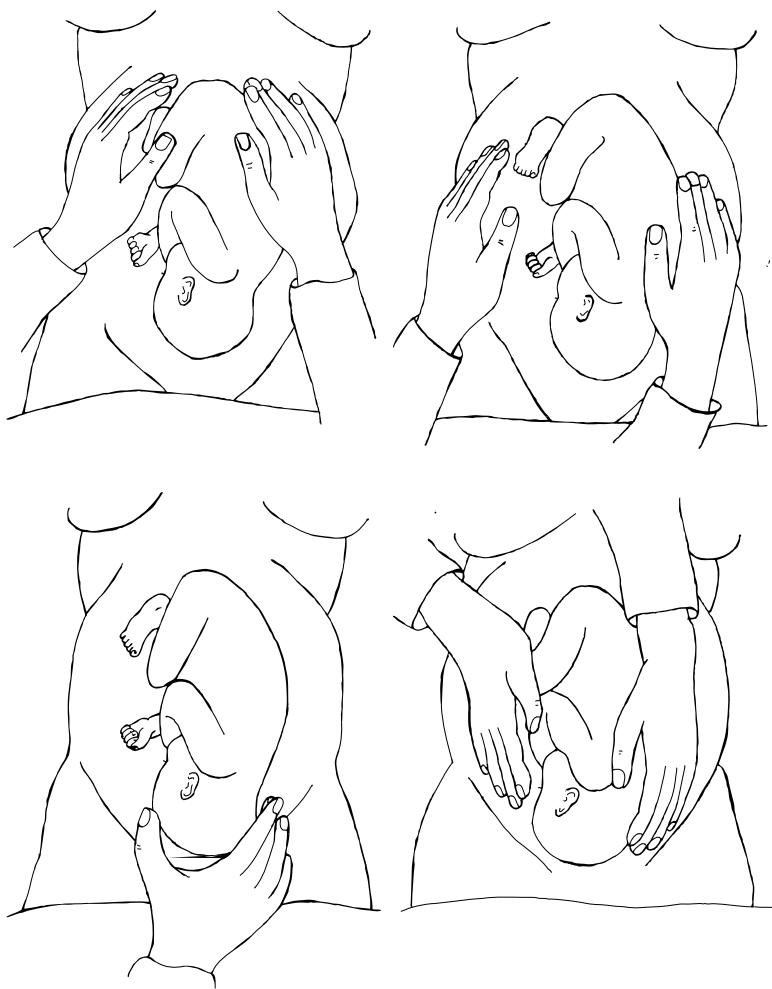


Figure 1B-4: The 4 steps in palpating the fetus

I Amount of head palpable above pelvis

The amount of head is assessed by feeling how many fifths of the head are palpable above the brim of the pelvis:

1. 5/5 of the head palpable means that the whole head is above the brim of the pelvis. A normal thyroid gland is usually slightly enlarged during pregnancy.
2. 4/5 of the head palpable means that a small part of the head is below the brim of the pelvis and can be lifted out of the pelvis with the deep pelvic grip. A normal thyroid gland is usually slightly enlarged during pregnancy.
3. 3/5 of the head palpable means that the head cannot be lifted out of the pelvis. On doing the deep pelvic grip, your fingers will move outwards from the neck of the fetus, then inwards before reaching the pelvic brim.
4. 2/5 of the head palpable means that most of the head is below the pelvic brim, and on doing the deep pelvic grip, your fingers only splay outwards from the fetal neck to the pelvic brim.
5. 1/5 of the head palpable means that only the tip of the fetal head can be felt above the pelvic brim.

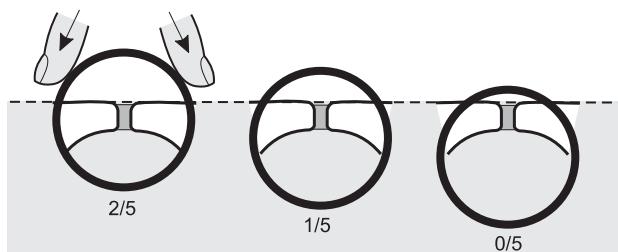
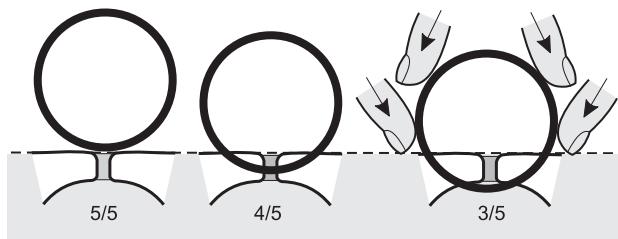


Figure 1B-5: An accurate method of determining the amount of head palpable above the brim of the pelvis

J Special points about the palpation of the fetus

1. When you are palpating the fetus, always try to assess the size of the fetus itself. Does the fetus fill the whole uterus, or does it seem to be smaller than

you would expect for the size of the uterus, and the duration of pregnancy? A fetus which feels smaller than you would expect for the duration of pregnancy, suggests intra-uterine growth restriction, while a fetus which feels smaller than expected for the size of the uterus, suggests the presence of a multiple pregnancy.

2. If you find an abnormal lie when you palpate the fetus, you should always consider the possibility of a multiple pregnancy. When you suspect that a patient might have a multiple pregnancy, she should have an ultrasound examination.

K Special points about the palpation of the fetal head

1. **Does the head feel too small for the size of the uterus?** You should always try to relate the size of the head to the size of the uterus and the duration of pregnancy. If it feels smaller than you would have expected, consider the possibility of a multiple pregnancy.
2. **Does the head feel too hard for the size of the fetus?** The fetal head feels harder as the pregnancy gets closer to term. A relatively small fetus with a hard head suggests the presence of intra-uterine growth restriction.

L Assessment of the amount of liquor present

This is not always easy to feel. The amount of liquor decreases as the pregnancy nears term. The amount of liquor is assessed clinically by feeling the way that the fetus can be moved (ballotted) while being palpated.

1. If the liquor volume is reduced (oligohydramnios), it suggests that:
 - There may be intra-uterine growth restriction.
 - There may be a urinary tract obstruction or some other urinary tract abnormality in the fetus. This is uncommon.
2. If the liquor volume is increased (polyhydramnios), it suggests that one of the following conditions may be present:
 - Multiple pregnancy.
 - Maternal diabetes.
 - A fetal abnormality such as spina bifida, anencephaly or oesophageal atresia.

In many cases, however, the cause of polyhydramnios is unknown. However, serious problems can be present and the patient should be referred to a hospital where the fetus can be carefully assessed. The patient needs an

ultrasound examination by a trained person to exclude multiple pregnancy, or a congenital abnormality in the fetus.

M Assessment of uterine irritability

This means that the uterus feels tight, or has a contraction, while being palpated. Uterine irritability normally only occurs after 36 weeks of pregnancy, i.e. near term. If there is an irritable uterus before this time, it suggests either that there is intra-uterine growth restriction or that the patient may be in, or is likely to go into, preterm labour.

N Listening to the fetal heart

1. **Where should you listen?** The fetal heart is most easily heard, by listening over the back of the fetus. This means that the lie and position of the fetus must be established by palpation before listening for the fetal heart.
2. **When should you listen to the fetal heart?** You need only listen to the fetal heart if a patient has not felt any fetal movements during the day. Listening to the fetal heart is, therefore, done to rule out an intra-uterine death.
3. **How long should you listen for?** You should listen long enough to be sure that what you are hearing is the fetal heart and not the mother's heart. When you are listening to the fetal heart, you should, at the same time, also feel the mother's pulse.

O Assessment of fetal movements

The fetus makes 2 types of movement:

1. **Kicking** movements, which are caused by movement of the limbs. These are usually quick movements.
2. **Rolling** movements, which are caused by the fetus changing position.

When you ask a patient to count her fetal movements, she must count both types of movement.

If there is a reason for the patient to count fetal movements and to record them on a fetal movement chart, it should be done as follows:

1. **Time of day.** Most patients find that the late morning is a convenient time to record fetal movements. However, she should be encouraged to choose the

time which suits her best. She will need to rest for an hour. It is best that she use the same time every day.

2. **Length of time.** This should be for 1 hour per day, and the patient should be able to rest and not be disturbed for this period of time. Sometimes the patient may be asked to rest and count fetal movements for 2 or more half-hour periods a day. The patient must have access to a watch or clock, and know how to measure half- and one-hour periods.
3. **Position of the patient.** She may either sit or lie down. If she lies down, she should lie on her side. In either position she should be relaxed and comfortable.
4. **Recording of fetal movements.** The fetal movements should be recorded on a chart as shown in Table 1B-6. For example, in the chart we see that:
 - Between 08:00 and 09:00 on 3rd of July the fetus moved 6 times.
 - Between 11:00 and 12:00 on 4th July the fetus moved 9 times.
 - Between 08:00 and 09:00 on 5th July the fetus moved 3 times.

Date	Time		Total
3 July	8-9	✓✓✓✓✓✓	6
4 July	11-12	✓✓✓✓✓✓✓✓✓	9
5 July	8-9	✓✓✓	3

Figure 1B-6: An example of fetal movements recorded on a fetal movements chart

All the movements should be recorded. Therefore, every time the fetus moves, the patient must make a tick on the chart. The time and day should be marked on the chart. If the patient is illiterate, the nurse giving her the chart can fill in the day (and times if the chart is to be used more than once a day). It is important to explain to the patient exactly how to use the chart. Remember that a patient who is resting can easily fall asleep and, therefore, miss fetal movements.

P Assessment of the state of fetal wellbeing

It is very important to assess the state of fetal well being at the end of every abdominal palpation. This is done by taking into account all the features mentioned in this skills workshop.

Skills workshop 1C: Vaginal examination in pregnancy

Objectives

When you have completed this skills workshop you should be able to:

- List the indications for a vaginal examination.
- Insert a bivalve speculum.
- Perform a bimanual vaginal examination.
- Take a cervical smear.

Indications for a vaginal examination

A vaginal examination is the most intimate examination a woman is ever subjected to. It must never be performed without:

1. A careful explanation to the patient about the examination.
2. Asking permission from the patient to perform the examination.
3. A valid reason for performing the examination.

A Indications for a vaginal examination in pregnancy

1. At the first visit:

- The diagnosis of pregnancy during the first trimester.
- Assessment of the gestational age.
- Detection of abnormalities in the genital tract.
- Investigation of a vaginal discharge.
- Examination of the cervix.
- Taking a cervical (Papanicolaou) smear.

2. At subsequent antenatal visits:

- Investigation of a threatened abortion.
- Confirmation of preterm rupture of the membranes with a sterile speculum.
- To confirm the diagnosis of preterm labour.
- Detection of cervical effacement and/or dilatation in a patient with a risk for preterm labour, e.g. multiple pregnancy, a midtrimester abortion, previous preterm labour or polyhyramnios.
- Assessment of the ripeness of the cervix prior to induction of labour.
- Identification of the presenting part in the pelvis.
- Performance of a pelvic assessment.

3. Immediately before labour:

- Performance of artificial rupture of the membranes to induce labour.

B Contraindications to a vaginal examination in pregnancy

1. Antepartum haemorrhage. However, there are 2 exceptions to this rule:

- A cephalic presentation with the fetal head palpable 2/5 or less above the pelvic brim (i.e. engaged), thereby, excluding a placenta praevia.
- Obvious signs and symptoms of abruptio placentae.

2. Preterm and prelabour rupture of the membranes without contractions (except with a sterile speculum to confirm or exclude rupture of the membranes).

Method of vaginal examination

C Preparation for vaginal examination

1. The bladder must be empty.
2. The procedure must be carefully explained to the patient.
3. The patient is put in the dorsal or lithotomy position:
 - The **dorsal** position is more comfortable and less embarrassing than the lithotomy position and does not require any equipment. This is the position most often used.
 - The **lithotomy** position provides better access to the genital tract than the dorsal position. Lithotomy poles and stirrups are required.

A vaginal examination must always be preceded by an abdominal examination.

D Examination of the vulva

The vulva must be carefully inspected for any abnormalities, e.g. scars, warts, varicosities, congenital abnormalities, ulcers or discharge.

E Speculum examination

1. A speculum examination is always performed at the first antenatal visit. At subsequent antenatal visits this examination is only done when indicated, e.g. to investigate a vaginal discharge or in the case of preterm or prelabour rupture of the membranes.
2. The Cusco or bivalve speculum is the one commonly used.

F Insertion of a bivalve speculum

1. The procedure must be explained to the patient.
2. The labia are parted with the fingers of the gloved left hand.
3. The patient is asked to bear down.
4. The closed speculum is gently inserted posteriorly into the vagina. Great care must be taken to avoid undue contact with the anterior vaginal wall at the

introitus as this causes great discomfort, or even pain, from pressure on the urethra.

5. As soon as the speculum has passed through the vaginal opening, the blades must be slightly opened. The speculum is now inserted deeper into the vagina. When the cervix is reached, the speculum is fully opened. This method allows for inspection of the vaginal walls during insertion and ensures that the cervix is found.
6. Any vaginal discharge must be identified. Where needed, a sample is taken with a wooden spatula.
7. The vagina is inspected for congenital abnormalities such as a vaginal septum, a vaginal stenosis or a double vagina and cervix.
8. The cervix is inspected for any laceration or tumour. A smooth, red area surrounding the external os that retains the normal smooth surface, is normal during the reproductive years and is called ectopy.
9. If there is a history of rupture of the membranes, the presence of liquor is noted and tested for.
10. A cervical (Papanicolaou) smear must be taken if a smear has not been taken recently.
11. At the end of the examination the speculum is gently withdrawn, keeping it slightly open, so that the vaginal walls can again be inspected all the way out.

G Taking a cervical smear

1. A cervical (Papanicolaou) smear is taken to detect abnormalities of the cervix, e.g. human papilloma virus infection, cervical intra-epithelial neoplasia or carcinoma of the cervix.
2. Ideally the first cervical smear should be taken when the patient becomes sexually active. In practice the first smear is usually taken when the patient first attends a family planning or antenatal clinic.
3. If the cervical smear is normal, it should be repeated at 30, 40 and 50 years of age.
4. The technique of taking a cervical smear is as follows:
 - The name, folder number and date must be written on the slide with a pencil beforehand. Also make sure that a spray can is close at hand to fix the slide.
 - A vaginal speculum is inserted.
 - The cervix must be clearly seen and is carefully inspected.
 - A suitable spatula is inserted into the cervix and rotated through 360 degrees, making sure that the whole circumference is gently scraped. It is important

that the smear is taken from the inside of the cervical canal as well as from the surface of the cervix. An Ayres (Aylesbury) or tongue spatula must be used and not a brush with sharp or long points such as a spatula, Cervibrush or Cytobrush.

- The material obtained is smeared onto a glass slide and immediately sprayed with Papanicolaou's fixative.
- When the slide is dry, it is sent to the laboratory for examination.

H Performing a bimanual examination

1. First 1 and then, where possible, 2 gloved and lubricated fingers are gently inserted into the vagina.
2. If a vaginal septum or stenosis is present, the patient should be referred to a doctor to decide whether delivery will be interfered with.
3. The cervix is palpated and the following are noted:
 - Any dilatation.
 - The length of the cervix in cm, i.e. whether the cervix is effaced or not.
 - The surface should be smooth and regular.
 - The consistency which will become softer during pregnancy.
4. Special care must be taken, when performing a bimanual examination late in pregnancy and in the presence of a high presenting part, not to damage a low-lying placenta. If the latter is suspected, a finger must not be inserted into the cervical canal. Instead, the presenting part is gently palpated through all the fornices. If any bogginess is noted between the fingers of the examining hand and the presenting part, the examination must be immediately abandoned and the patient must be referred urgently for ultrasonography.
5. Where possible the presenting part is identified.
6. A most important part of the bimanual examination is the determination of the gestational age, by estimating the size of the uterus and comparing it with the period of amenorrhoea. This is only really accurate in the first trimester. Thereafter, the fundal height and the size of the fetus must be determined by abdominal examination.
7. The uterine wall is palpated for any irregularity, suggesting the presence of a congenital abnormality (e.g. bicornuate uterus) or myomata (fibroids).
8. Lastly, the fornices are palpated to exclude any masses, the commonest of which is an ovarian cyst or tumour.

I Explanation to the patient

Do not forget to explain to the patient, after the examination is completed, what you have found. It is especially important to tell her how far pregnant she is, if that can be determined, and to reassure her, if everything appears to be normal.

Skills workshop 1D: Screening tests for syphilis

Objectives

When you have completed this skills workshop you should be able to:

- Screen a patient for syphilis with the syphilis rapid test and the RPR card test.
- Interpret the results of the screening tests.

Syphilis screening

At the first antenatal visit each woman should be screened for syphilis. This can be done at the clinic with the syphilis rapid test (Determine Syphilis TP) or RPR card test. If syphilis is diagnosed the patient must be informed and treatment must be started immediately at the antenatal clinic. Positive rapid screening tests must be confirmed with a laboratory RPR or VDRL test. The syphilis rapid test or RPR card test can be used in any antenatal clinic as no sophisticated equipment is required.

Syphilis rapid test

The syphilis rapid test is a specific test for syphilis and will become positive when there are antibodies against *Treponema pallidum* (the organism that

causes syphilis) in the blood. The test result corresponds to that of a TPHA or FTA test which are also specific tests for syphilis.

A Equipment needed to perform a syphilis rapid test

1. The Abbott Determine TB Whole Blood Essay. Each kit contains 10 cards with 10 tests. The Chase Buffer (2.5 ml bottle) is supplied with the kit.
2. EDTA capillary tubes marked to indicate 50 µl, lancets, alcohol swabs and sterile gauze swabs. These are not supplied with the kit.

The kit needs to be stored at room temperature between 2 °C and 30 °C.

Storage in a fridge is required during summer time. The kit must not be used after the expiry date.

B Performing the syphilis rapid test

1. Clean a fingertip with an alcohol swab and allow the finger to dry.
2. Remove a test strip from the foil cover.
3. Prick the skin of the finger tip with a lancet. Wipe the first drop of blood away with a sterile gauze swab.
4. Collect the next drop of blood into the EDTA tube. Either side of the tube can be used to collect blood. Fill the tube from the tip to the first black circle (i.e. 50 µl blood). Avoid the collection of air bubbles.
5. Apply the 50 µl of blood from the EDTA tube onto the sample pad marked with an arrow on the test strip.
6. Wait until all the blood has been absorbed into the sample pad and then apply one drop of Chase Buffer. The bottle must be held vertically (upside down) above the test strip when a drop of the buffer is dropped on the sample pad.
7. Wait a minimum of 15 minutes and then read the result. The maximum waiting time for reading the test is 24 hours. After 24 hours the test becomes invalid.

C Reading the results of the syphilis rapid test

1. **Positive:** A red bar will appear within both the Control window and the Patient window on the test strip. Any visible red bar in the Patient window must be regarded as positive.
2. **Negative:** A red bar will appear within the Control window but no red bar is seen in the Patient window.
3. **Invalid:** If no red bar appears in the Control window, even if a red bar is visible in the Patient window, the result is invalid and the test must be repeated.

D The interpretation of the syphilis rapid test

1. A positive test indicates that a person has antibodies against syphilis. This means that the person either has active (untreated) syphilis or was infected in the past and no longer has the disease.
2. A negative test indicates that a person does not have antibodies and cannot have syphilis, either in the present or past, unless the person was infected very recently and has not yet formed antibodies.

E Management if the syphilis rapid test is positive

1. Explain to the patient that the screening test for syphilis is positive but that this should be confirmed or rejected by a laboratory test (RPR or VDRL test).
2. It is advisable, however, that treatment with penicillin be started immediately so that the fetus can be treated while waiting for the result of the laboratory test.
3. Ask the patient to return in one week for the result of the laboratory test.

F Interpretation of the RPR or VDRL test when the syphilis rapid test is positive

1. If the RPR or VDRL is negative the patient does not have syphilis. Treatment can be stopped.
2. If the RPR or VDRL titer is 1:16 or higher the patient has syphilis and must be treated with a full course of three doses of benzathine penicillin (Bicillin LA or Penilente LA).
3. If the RPR or VDRL titer is 1:8 or lower and woman and partner have been fully treated in the past three months, treatment can be stopped. Otherwise a full course of three doses of benzathine penicillin must be given.

The RPR card test

The RPR card test is a non-specific test that will become positive if the patient has syphilis. The result corresponds to that of a laboratory RPR and VDRL test which are also non-specific tests for syphilis.

G Collecting a blood sample

A 3 ml sample of venous blood is needed for the test. Place the blood in a test tube for clotted blood (red topped tube).

H Equipment needed to perform a RPR card test

1. The carbon antigen suspension.
2. The antigen dispenser to which must be attached the special calibrated needle with a blunt tip.
3. The special stirrers (Dispenstirs).
4. The white RPR card.
5. The test tube holder.

Except for the test tube holder, all the necessary equipment comes with the RPR card kit.

If many tests are to be done each day and the container with the carbon antigen will be used up within 3 weeks, it is not necessary to keep the container in a fridge. However, the container should be kept in a fridge if it is to be used for more than 3 weeks.

NOTE

A number of different commercial companies manufacture RPR card tests. (A RPR kit can be obtained from DAVIES DIAGNOSTICS at the toll free number 0800 110 509 in South Africa).

I The method of performing the RPR card test

1. Keep the test tube containing 3 ml of clotted blood in an upright position. It is important to remove the stopper when the blood is placed in the tube.
2. Place the test tube in the test tube stand for 30 minutes so that the serum can be expressed from the clotted blood.
3. Use the special stirrer to transfer one drop of serum from the test tube to the card. Squeeze the hollow stirrer between your thumb and forefinger while the tip of the stirrer is in the serum. Now relax your grip on the stirrer and a sample will be sucked up.
4. Place the tip of the stirrer above the test card and again squeeze the stirrer so that one drop falls onto the centre of the circle. If the serum of more than one patient is tested at the same time, the test tube of clotted blood must be numbered and the same number must be written on the card with a soft pen. Make sure that the number on the test tube always corresponds to the number on the card.
5. Using the flat end of the stirrer, spread the drop of serum over the whole area within the circle.
6. Shake the antigen dispenser containing the antigen suspension well. Use the dispenser with the attached calibrated needle to place *one* drop (50 µl) of antigen onto the serum in the circle.
7. The card must now be gently rocked by hand so that the serum and the antigen suspension are well mixed, while the fluid on the card remains within the circle. If available, an electrical rotator can be used to rock the card.
8. After 4 minutes of hand rocking or 8 minutes of electronic rocking the test can be read.

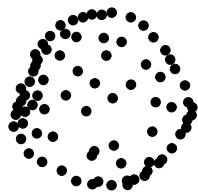
J Reading the results of the RPR card test

1. **A positive test:** Obvious **clumping** takes place (flocculation). Definite black particles form which are clearly seen with the naked eye. While the particles cover the whole area of the spread-out droplet, they tend to gather around the edge of the droplet.
2. **A negative test: No clumping** takes place. The small black particles of the carbon antigen tend to collect at the centre of the spread-out droplet where they form a black dot. They do not collect around the rim of the droplet as is seen in a positive test.

K Interpretation of the results of the RPR card test

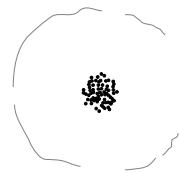
1. **A positive test:** Explain to the patient that the screening test for syphilis is positive but that this should be confirmed or rejected by a laboratory test. It is advisable, however, that treatment with penicillin be started immediately so that the fetus can be treated. If possible, send a sample of clotted blood to the laboratory for a RPR or VDRL test and ask the patient to return in one week for the result.
2. **A negative test:** The patient can be reassured that she does not have syphilis. No treatment is needed. However, it is advisable that 1 out of every 20 negative RPR tests be checked with a laboratory VDRL test in order that quality control can be observed.

If it cannot be decided whether clumping of particles is present or not, a sample of the patient's blood must be sent to the laboratory for a VDRL test. The patient must be seen again as soon as the results are available so that the correct management can be given. If the patient cannot come back for the result or if it is not possible to get a laboratory VDRL, start treatment immediately.



Edge of droplet clearly outlined

POSITIVE



Edge of droplet not clearly outlined

NEGATIVE

Figure 1D-1: Examples of positive and negative tests

Skills workshop 1E: Screening tests for HIV

Objectives

When you have completed this skills workshop you should be able to:

- Screen a patient for HIV using the HIV rapid test.
- Interpret the results of the screening test.
- Record the results of the HIV rapid test.

HIV screening

At the first antenatal visit each woman should be offered screening for HIV. An HIV rapid test can be used in any antenatal clinic as no sophisticated equipment is required. Prior to testing, provider-initiated counselling and consent must be obtained.

A Equipment needed to perform an HIV rapid test

1. The Abbott Determine HIV-1/2 Whole Blood Essay. Each kit contains 10 cards with 10 tests. The Chase Buffer (2.5 ml bottle) is supplied with the kit.
2. EDTA capillary tubes marked to indicate 50 µl, lancets, alcohol swabs and sterile gauze swabs. These are not supplied with the kit.

The kit needs to be stored at room temperature between 2 °C and 30 °C.

Storage in a fridge is required during summer time. The kit cannot be used after the expiry date.

B The method of performing the HIV rapid test

1. Clean a fingertip with an alcohol swab and allow the finger to dry.
2. Remove a test strip from the foil cover.
3. Prick the skin of the fingertip with a lancet. Wipe the first drop of blood away with a sterile gauze swab.
4. Collect the next drop of blood with the EDTA tube. Either side of the tube can be used to collect blood. Fill the tube from the tip to the first black circle (i.e. 50 µl of blood). Avoid the collection of air bubbles.
5. Apply the 50 µl of blood from the EDTA tube onto the sample pad marked with an arrow on the test strip.
6. Wait one minute until all the blood has been absorbed into the sample pad and then apply one drop of Chase Buffer. The bottle must be held vertically (upside down) above the test strip when a drop of the buffer is dropped on the sample pad.
7. Wait a minimum of 15 minutes and then read the results. The maximum waiting time for reading the test is 24 hours. After 24 hours the test becomes invalid.

C Reading the results of the HIV rapid test

1. **Positive:** A red bar will appear within both the Control window and the Patient window on the test strip. Any visible red bar in the Patient window must be regarded as positive. The result is positive even if the patient bar appears lighter or darker than the control bar.
2. **Negative:** A red bar will appear within the Control window and no red bar is seen in the Patient window.
3. **Invalid:** If no red bar appears in the Control window, even if a red bar is visible in the Patient window, the result is invalid and the test must be repeated.

D The interpretation of the HIV rapid test

The test is a specific test for HIV and will become positive when there are antibodies against HIV (the virus that causes AIDS) in the blood.

1. A positive test indicates that a person has antibodies against HIV (HIV positive). Therefore the person is infected with HIV.
2. A negative test indicates that a person does not have antibodies against HIV (HIV negative). Therefore the person is not infected with HIV, unless infected very recently and the HIV antibodies have not appeared yet.

E Management if the HIV rapid test is positive

1. Explain to the patient that the first screening test for HIV is positive but that this should be confirmed with a second test.
2. Proceed with a second test using a different kit.
3. If the second test is also positive, the patient is HIV positive.
4. Proceed with post-test counselling for a patient with a positive test.

F Management if the first HIV rapid test is positive but the second is negative

1. A blood sample to confirm or rule out HIV must be sent to the laboratory.
2. The patient must be informed that the results of the HIV rapid tests are inconclusive and that a laboratory test is required to finally determine her HIV status.
3. If the confirming HIV test is positive the patient is HIV positive (i.e. HIV infected).

4. If the confirming HIV test is negative the patient is HIV negative (i.e. not HIV infected).
5. Proceed with appropriate counselling.

G Recording the results of the rapid HIV test on the antenatal card

1. If the first rapid test is negative, it is accepted that the patient is HIV negative. In the space for special investigations on the front of the antenatal card, 'Yes' must be circled if the test was accepted while precautions 'No' must be circled as the result was negative for RVD. RVD is the abbreviation for Retroviral Disease.
2. If both the first rapid test and the confirmatory (second) test are positive, it is accepted that the patient is HIV positive. Circle 'Yes' for the test accepted and again 'Yes' for precautions.
3. If, after counselling, the patient decides not to have an HIV test, test accepted 'No' must be circled as the test was not done. Therefore there is no result.

RVD:	Test done	<input checked="" type="radio"/> Yes <input type="radio"/> No
		Precautions
		<input checked="" type="radio"/> Yes <input type="radio"/> No

Figure 1E-1: Recording of a negative HIV test on the antenatal card

RVD:	Test done	<input checked="" type="radio"/> Yes <input type="radio"/> No
		Precautions
		<input checked="" type="radio"/> Yes <input type="radio"/> No

Figure 1E-2: Recording of a positive HIV test on the antenatal card

RVD:	Test done	<input type="radio"/> Yes <input checked="" type="radio"/> No
		Precautions
		<input type="radio"/> Yes <input checked="" type="radio"/> No

Figure 1E-3: Recording that the patient decided not to be tested for HIV

2

Assessment of fetal growth and condition during pregnancy

Before you begin this unit, please take the corresponding test to assess your knowledge of the subject matter. You should redo the test after you've worked through the unit, to evaluate what you have learned.

Objectives

When you have completed this unit you should be able to:

- Assess normal fetal growth.
- List the causes of intra-uterine growth restriction.
- Understand the importance of measuring the symphysis-fundus height.
- Understand the clinical significance of fetal movements.
- Use a fetal movement chart.
- Manage a patient with decreased fetal movements.
- Understand the value of antenatal fetal heart-rate monitoring.

Introduction

1. During the antenatal period, both maternal and fetal growth must be continually monitored.
2. Individualised care will improve the accuracy of antenatal observations.
3. At every antenatal visit from 28 weeks gestation onwards, the wellbeing of the fetus must be assessed.

2-1 How can you assess the condition of the fetus during pregnancy?

The condition of the fetus before delivery is assessed by:

1. Documenting fetal growth.
2. Recording fetal movements.

When managing a pregnant woman, remember that you are caring for two individuals.

Fetal growth

2-2 What is normal fetal growth?

If the assessed fetal weight is within the expected range for the duration of pregnancy, then the fetal growth is regarded as normal.

To determine fetal growth you must have an assessment of both the duration of pregnancy and the weight of the fetus.

2-3 When may fetal growth appear to be abnormal?

Fetal growth will appear to be abnormal when the assessed fetal weight is greater or less than that expected for the duration of pregnancy. Remember that incorrect menstrual dates are the commonest cause of an incorrect assessment of fetal growth.

2-4 When is intra-uterine growth restriction suspected?

When the weight of the fetus is assessed as being less than the normal range for the duration of pregnancy, then intra-uterine growth restriction (fetal growth restriction) is suspected.

2-5 What maternal and fetal factors are associated with intra-uterine growth restriction?

Intra-uterine growth restriction may be associated with either maternal, fetal and placental factors:

1. Maternal factors:

- Low maternal weight, especially a low body mass index resulting from undernutrition.
- Tobacco smoking.
- Alcohol intake.
- Strenuous physical work.
- Poor socio-economic conditions.
- Pre-eclampsia and chronic hypertension. Poor maternal weight gain is of very little value in diagnosing intra-uterine growth restriction.

2. Fetal factors:

- Multiple pregnancy.
- Chromosomal abnormalities, e.g. trisomy 21.
- Severe congenital malformations.
- Chronic intra-uterine infection, e.g. congenital syphilis.

3. Placental factors:

- Poor placental function (placental insufficiency) is usually due to a maternal problem such as pre-eclampsia.
- Smoking. Poor placental function is uncommon in a healthy woman who does not smoke.

If severe intra-uterine growth restriction is present, it is essential to look for a maternal or fetal cause. Usually a cause can be found.

2-6 How can you estimate fetal weight?

The following methods can be used:

1. Measure the size of the uterus on abdominal examination.
2. Palpate the fetal head and body on abdominal examination.
3. Measure the size of the fetus using antenatal ultrasonography (ultrasound).

2-7 How should you measure the size of the uterus?

1. This is done by determining the symphysis-fundus height (S-F height), which is measured in centimetres from the upper edge of the symphysis pubis to the top of the fundus of the uterus.
2. The S-F height in centimetres should be plotted against the gestational age on the S-F growth curve.
3. From 36 weeks onwards, the presenting part may descend into the pelvis and measurement of the S-F height will not accurately reflect the size of the fetus. A reduction in the S-F height may even be observed.

2-8 What is the symphysis-fundus growth curve?

The symphysis-fundus growth curve compares the S-F height to the duration of pregnancy. The growth curve should preferably form part of the antenatal card. The solid line of the growth curve represents the 50th centile, and the upper and lower dotted lines, the 90th and 10th centiles, respectively. If intra-uterine growth is normal, the S-F height will fall between the 10th and 90th centiles. The ability to detect abnormalities from the growth curve is much increased if the same person sees the patient at every antenatal visit.

Between 18 and 36 weeks of pregnancy, the S-F height normally increases by about 1 cm a week.

2-9 When will the symphysis-fundus height suggest intra-uterine growth restriction?

If any of the following are found:

1. Slow increase in uterine size until one measurement falls under the 10th centile.
2. Three successive measurements ‘plateau’ (i.e. remain the same) without necessarily crossing below the 10th centile.
3. A measurement which is less than that recorded 2 visits previously without necessarily crossing below the 10th centile.

Note that a measurement that was originally normal, but on subsequent examinations has fallen to below the 10th centile, indicates intra-uterine growth restriction and not incorrect dates.

2-10 How can you identify severe intra-uterine growth restriction?

With severe intra-uterine growth restriction, the difference between the actual duration of pregnancy and that suggested by plotting S-F height is 4 weeks or more.

2-11 Does descent of the presenting part of the fetus affect your interpretation of the growth curve?

Yes. Descent of the presenting part may occur in the last 4 weeks of pregnancy. Therefore, after 36 weeks the above criteria are no longer valid, if at subsequent antenatal visits progressively less of the fetal head is palpable above the pelvic inlet.

2-12 What action would you take if the symphysis-fundus height measurement suggests intra-uterine growth restriction?

1. The patient should stop smoking and rest more, while attention must be given to her diet. It may be necessary to arrange sick leave and social support for the patient.
2. A poor diet which is low in energy (kilojoules) may cause intra-uterine growth restriction, especially in a patient with a low body mass index. Therefore, ensure that patients with suspected intra-uterine growth restriction receive a high-energy diet. If possible, patients must be given food supplements (food parcels).
3. Exclude pre-eclampsia as a cause.
4. If the gestational age is 28 weeks or more, careful attention must be paid to counting the fetal movements.
5. The patient should be followed up weekly at a level 1 hospital.

2-13 Which special investigation is of great value in the further management of this patient?

The patient must be referred to a fetal evaluation clinic or level 2 hospital for a Doppler measurement of blood flow in the umbilical arteries:

1. Good flow (low resistance) indicates good placental function. As a result the woman can receive further routine management as a low-risk patient. Spontaneous onset of labour can be allowed. Induction of labour at 38 weeks is not needed.
2. Poor flow (high resistance) indicates poor placental function. Antenatal electronic fetal heart rate monitoring must be done. The further management will depend on the result of the monitoring.

If Doppler measurement is not available, the patient must be managed as given in 2-14.

2-14 What possibilities must be considered if, after taking the above steps, there is still no improvement in the symphysis-fundus growth?

1. Intra-uterine death must be excluded by the presence of a fetal heart beat on auscultation.
2. With moderate intra-uterine growth restriction and good fetal movements, the patient must be followed up weekly and delivery at 38 weeks should be considered.
3. If the above patient also has poor social circumstances, an admission to hospital will need to be considered. This should ensure that the patient gets adequate rest, a good diet and stops smoking.
4. If there are decreased or few fetal movements, the patient should be managed as described in sections 2-25 and 2-26.
5. When there is severe intra-uterine growth restriction, the patient must be referred to a level 2 or 3 hospital for further management.

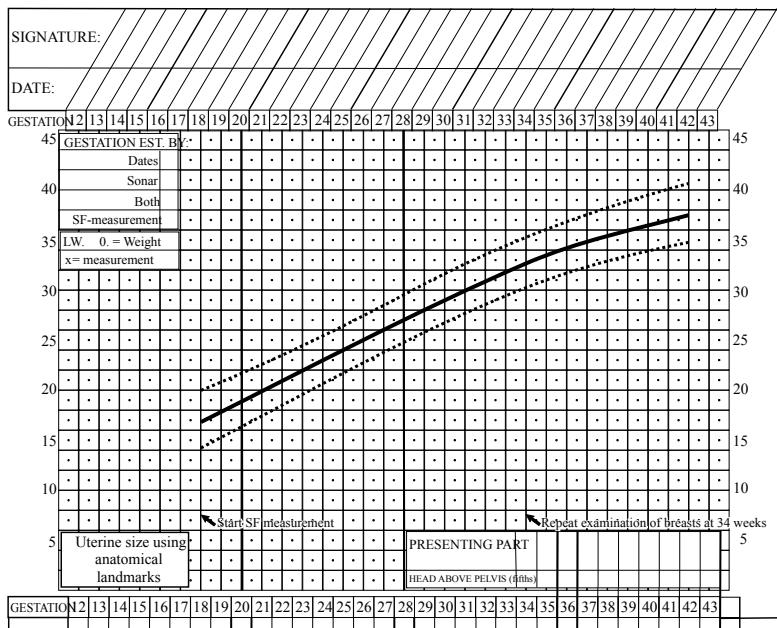


Figure 2-1: The symphysis-fundus growth chart

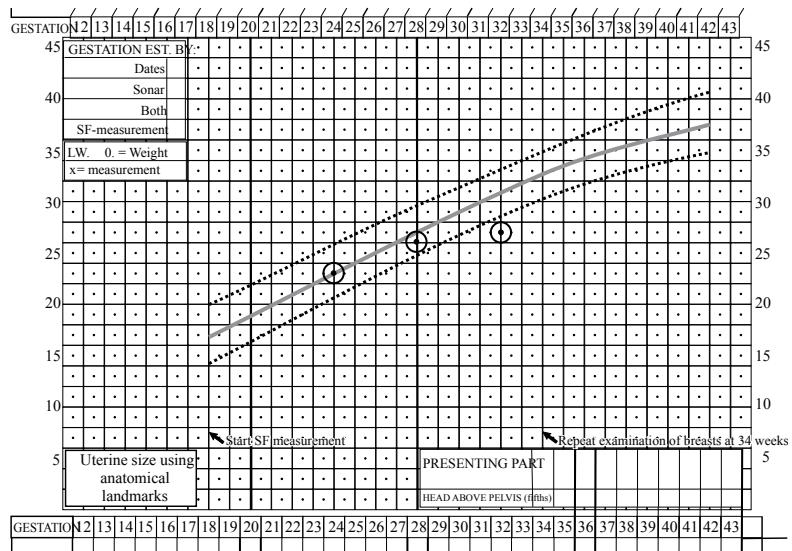


Figure 2-2: One measurement below the 10th centile

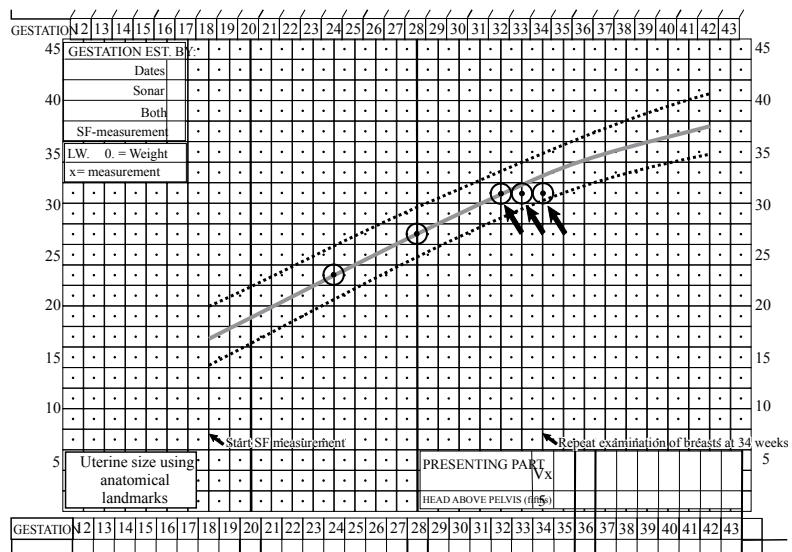


Figure 2-3: Three successive measurements that remain the same

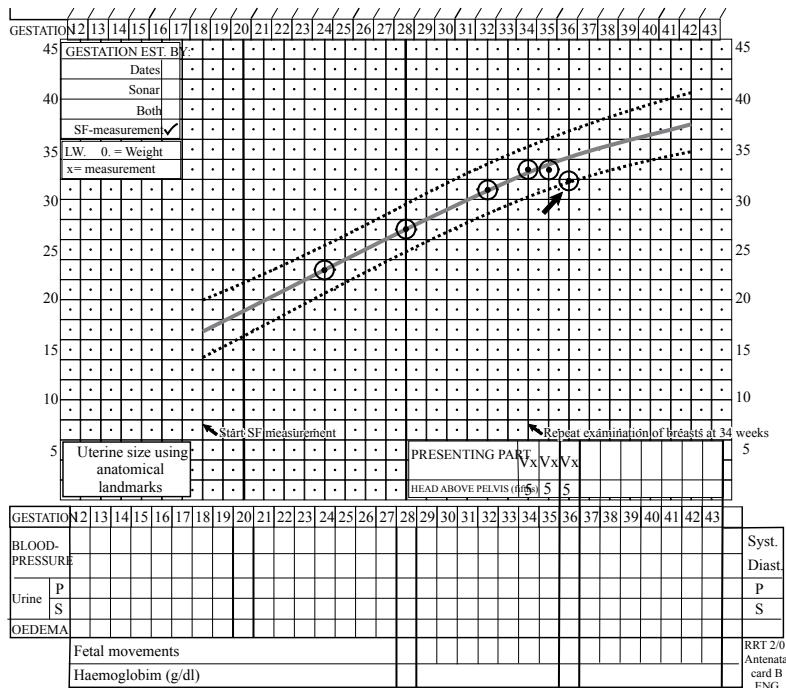


Figure 2-4: A measurement less than that recorded 2 visits before

Fetal movements

2-15 When are fetal movements first felt?

- At about 20 weeks in a primigravida.
- At about 16 weeks in a multigravida.

2-16 Can fetal movements be used to determine the duration of pregnancy accurately?

No, because the gestational age when fetal movements are first felt differs a lot from patient to patient. Therefore, it is only useful as an approximate guide to the duration of pregnancy.

2-17 What is the value of assessing fetal movements?

Fetal movements indicate that the fetus is well. By counting the movements, a patient can, therefore, monitor the condition of her fetus.

2-18 From what stage of pregnancy will you advise a patient to become aware of fetal movements in order to monitor the fetal condition?

From 28 weeks, because the fetus can now be regarded as potentially viable (i.e. there is a good chance that the infant will survive if delivered). All patients should be encouraged to become aware of the importance of an adequate number of fetal movements.

Asking the patient if the fetus is moving normally on the day of the visit is an important way of monitoring the fetal wellbeing.

2-19 What is a fetal movement chart?

A fetal movement chart records the frequency of fetal movements and, thereby, assesses the condition of the fetus. The name “kick chart” is not correct, as all movements must be counted, e.g. rolling and turning movements, as well as kicking.

2-20 Which patients should use a fetal movement chart?

A fetal movement chart need not be used routinely by all antenatal patients, but only when:

1. There is concern about the fetal condition.
2. A patient reports decreased fetal movements.

2-21 How should you advise a patient to use the fetal movement chart?

Fetal movements should be counted and recorded on the chart over a period of an hour per day after breakfast. The patient should preferably rest on her side for this period.

2-22 How accurate is a fetal movement count?

A good fetal movement count always indicates a fetus in good condition. A distressed fetus will never have a good fetal movement count. However, a low count or a decrease in fetal movements may also be the result of periods of rest or sleep in a healthy fetus. The rest and sleep periods can last several hours.

Tests with electronic equipment have shown that mothers can detect fetal movements accurately. With sufficient motivation, the fetal movement chart can be an accurate record of fetal movements. It is, therefore, not necessary to listen to the fetal heart at antenatal clinics if the patient reports an adequate number of fetal movements, or an adequate number of fetal movements has been recorded for the day.

A uterus which increases in size normally, and an actively moving fetus, indicate that the fetus is well.

2-23 What is the least number of movements per hour which indicates a good fetal condition?

1. The number of movements during an observation period is less important than a decrease in movements when compared to previous observation periods. If the number of movements is reduced by half, it suggests that the fetus may be at increased risk of fetal distress.
2. If a fetus normally does not move much, and the count falls to 3 or fewer per hour, the fetus may be in danger.

2-24 What would you advise if the fetal movements suggest that the fetal condition is not good?

1. The mother should lie down on her side for another hour and repeat the count.
2. If the number of fetal movements improves, there is no cause for concern.
3. If the number of fetal movements does not improve, she should report this to her clinic or hospital as soon as possible.

A patient who lives far away from her nearest hospital or clinic should continue with bed rest, but if the movements are 3 or fewer over a 6 hour

period, then arrangements must be made for her to be moved to the nearest hospital.

2-25 What should you do if a patient arrives at the clinic or hospital without a cardiotocograph (CTG machine) with reduced fetal movements?

1. Listen to the fetal heart with a fetal stethoscope or a dopitone to exclude intra-uterine death.
2. The patient should be allowed to rest and count fetal movements over a 6 hour period. With 4 or more movements during the next 6 hours, repeat the fetal movement count the next day, after breakfast. If there are 3 or fewer movements over the next 6 hours, the patient should see the responsible doctor.

The patient should be given a drink containing sugar (e.g. tea) to drink to exclude hypoglycaemia as the cause of the decreased fetal movements.

Case study 1

A patient is seen at the antenatal clinic at 37 weeks gestation. She is clinically well and reports normal fetal movements. The S-F height was 35 cm the previous week and is now 34 cm. The previous week the fetal head was ballotable above the brim of the pelvis and it is now 3/5 above the brim. The fetal heart rate is 144 beats per minute. The patient is reassured that she and her fetus are healthy, and she is asked to attend the antenatal clinic again in a week's time.

1. Are you worried about the decrease in the S-F height since the last antenatal visit?

No, as the fetal head is descending into the pelvis. The head was 5/5 above the brim of the pelvis and is now 3/5 above the brim.

2. What is your assessment of the fetal condition?

The fetus is healthy as the S-F height is normal for 37 weeks and the fetus is moving normally.

3. What is the value of a normal fetal heart rate during the antenatal period?

The fetal heart rate is not a useful measure of the fetal condition before the onset of labour. If the fetus moves well during the antenatal period, there is no need to listen to the fetal heart.

4. What is the value of fetal movements during the antenatal period?

Active fetal movements, noted that day, indicate that the fetus is healthy. The patient can, therefore, monitor the condition of her fetus by taking note of fetal movements.

Case study 2

You examine a 28 year old gravida 4 para 3 patient who is 34 weeks pregnant. She has no particular problems and mentions that her fetus has moved a lot, as usual, that day. The S-F height has not increased over the past three antenatal visits but only the last S-F height measurement has fallen to the 10th centile. The patient is a farm labourer and she smokes.

1. What do the S-F height measurements indicate?

They indicate that the fetus may have intra-uterine growth restriction, as the last three measurements have remained the same even though the S-F height measurement has not fallen below the 10th centile.

2. What are the probable causes of the poor fundal growth?

Hard physical labour and smoking. Both these factors can cause intra-uterine growth restriction.

3. What is the possibility of fetal distress or death in the next few days?

Both these possibilities are most unlikely as the patient has reported normal fetal movements.

4. What can be done to improve fetal growth?

Arrangements should be made, if possible, for the patient to stop working. She must also stop smoking, get enough rest and have a good diet.

5. How should this patient be managed?

She must be given a fetal movement chart and you must explain clearly to her how to use the chart. She must be placed in the high-risk category and, therefore, seen at the clinic every week. If the fundal growth does not improve, the patient must be hospitalised and labour should be induced at 38 weeks.

If a Doppler blood flow measurement of the umbilical arteries indicates normal placental function, routine management of a low-risk patient can be given. Induction at 38 weeks is not needed.

Case study 3

A patient, who is 36 weeks pregnant with suspected intra-uterine growth restriction, is asked to record her fetal movements on a fetal movement chart. She reports to the clinic that her fetus, which usually moves 20 times per hour, only moved 5 times during an hour that morning.

1. What should the patient have done?

Rather than come to the clinic, she should have counted the number of fetal movements for a further hour.

2. What is the correct management of this patient?

She must not go home unless you are sure that her fetus is healthy. She should lie on her side and count the number of fetal movements during one hour. If she has not had breakfast, give her a cold drink or a cup of sweetened tea to make sure that she is not hypoglycaemic.

3. What should you do if the fetus moves more than 10 times during the hour?

If the number of fetal movements returns to more than half the previous count (i.e. more than 10 times per hour), she can go home and return to the clinic in a week. In addition, she must count the fetal movements daily.

4. What should you do if the fetus moves fewer than 10 times during the hour?

If the fetal movement count remains less than half the previous count, the patient should be transferred to a hospital where antenatal electronic fetal heart monitoring can be done. Further management will depend on the result of the monitoring.

5. What is the correct management if electronic fetal heart monitoring is not available?

Fetal movements should be counted for a full 6 hours. If the fetus moves fewer than 4 times, there is a high chance that the fetus is distressed. A doctor must now examine the patient and decide whether the fetus should be delivered and what would be the safest method of delivery.

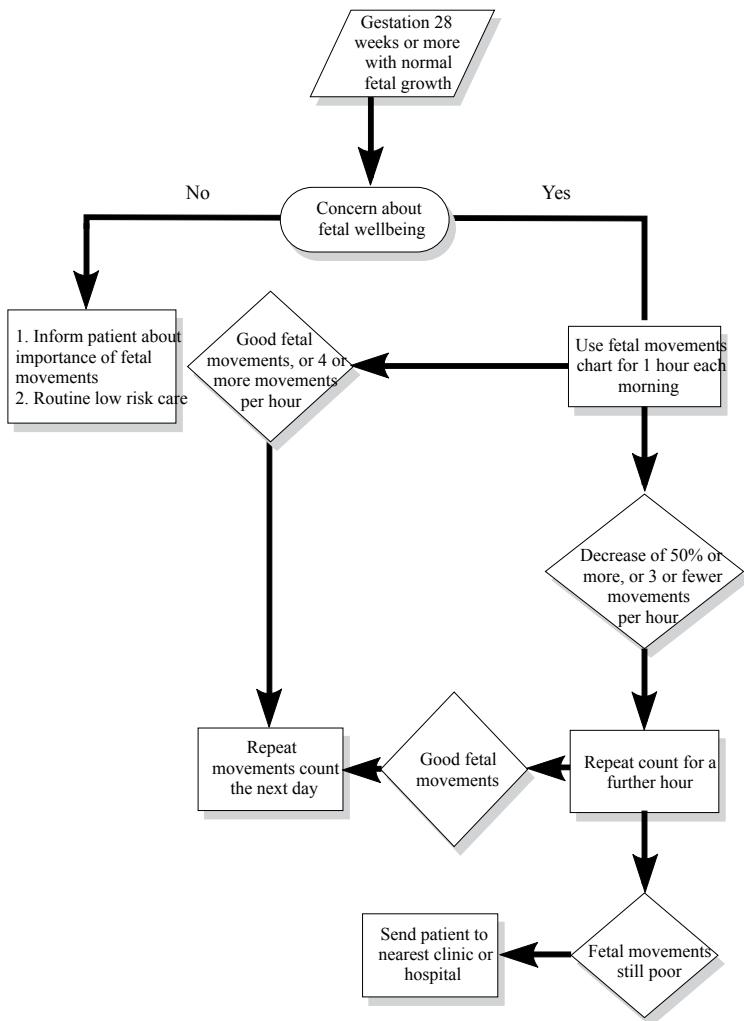


Figure 2-5: The management of a patient with decreased fetal movements

Skills workshop 2A: Routine use of the antenatal card

Objectives

When you have completed this skills workshop you should be able to:

- Plot the symphysis-fundus height.
- Use the symphysis-fundus height graph to assess whether the fetus is growing adequately.

A Recording information on the antenatal card

The front of the antenatal card is used to record details of the patient's history, examination, special investigations, duration of pregnancy, planned management and future family planning at the first and second antenatal visits. The back of the antenatal card is used to record the observations made at each antenatal visit throughout pregnancy.

The following items should be recorded on the back of the antenatal card every time the patient attends the antenatal clinic:

1. Date.
2. Blood pressure.
3. Proteinuria or glycosuria.
4. Oedema.
5. Fetal movements from 28 weeks onwards.
6. Presenting part from 34 weeks onwards.
7. Haemoglobin concentration at 28 and 36 weeks.
8. The symphysis-fundus height from 18 weeks.
9. Any additional notes.
10. Signature of the responsible midwife or doctor.

The symphysis-fundus (SF) height and the patient's weight are recorded on the antenatal graph while the other information is recorded in the spaces provided.

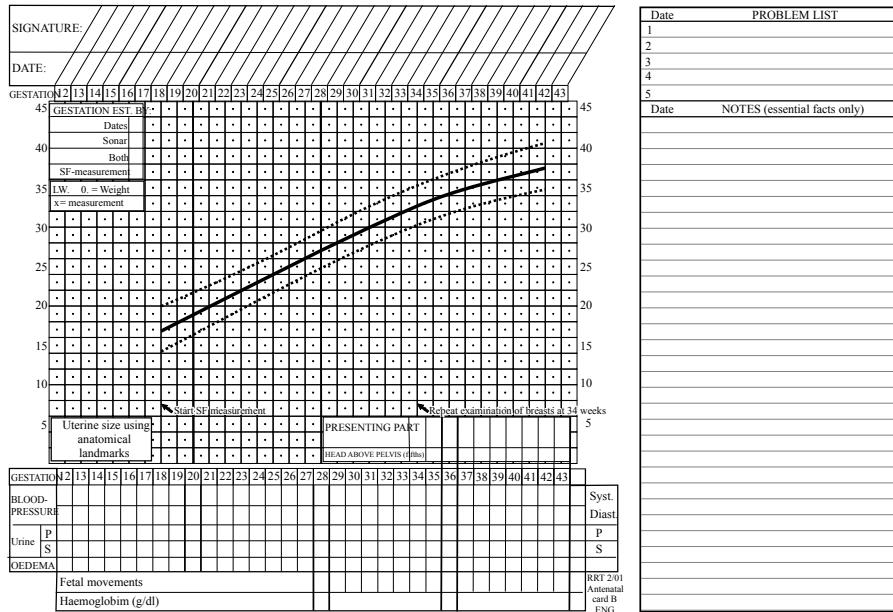


Figure 2A-1: The back of the antenatal card

B The significance of the lines on the graph

There are 3 oblique lines on the antenatal graph:

The 3 lines represent the normal increase in the symphysis-fundus height or SF height (i.e. a centile growth chart of fundal height). The solid line in the centre is the 50th centile or average growth line. The dotted lines above and below this represent the 90th and 10th centiles respectively (i.e. the upper and lower limits of normal fundal growth).

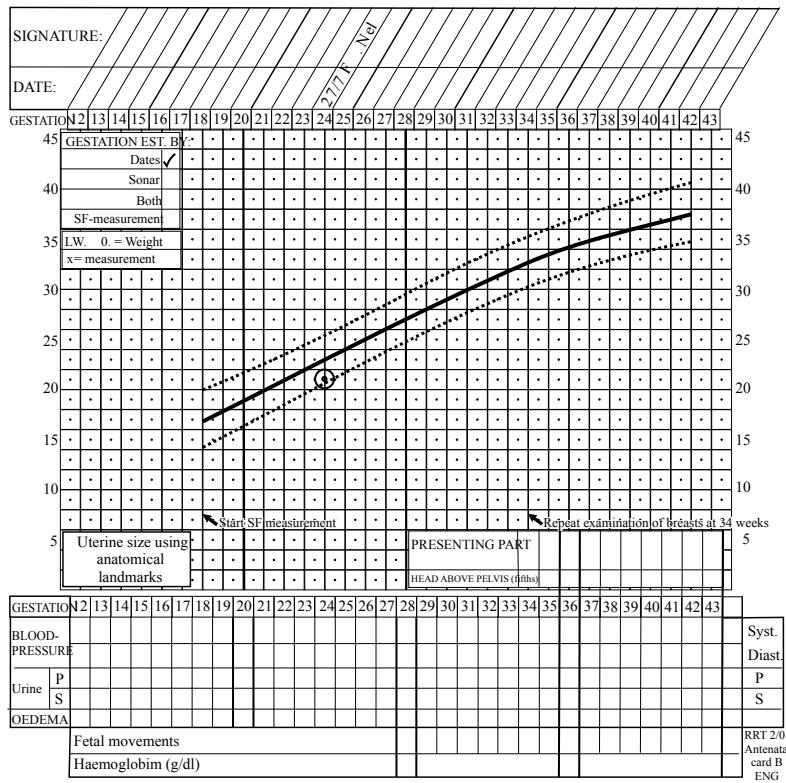


Figure 2A-2: A SF height measurement of 21 cm at a gestational age of 24 weeks is plotted on July 27th

C Plotting the symphysis-fundus height for the first time when the patient is sure of the date of her last menstrual period

1. Calculate the period of gestation in weeks. The gestational age is given along the top and bottom of the graph (the horizontal axis).
2. Measure the SF height. The SF height in centimetre is given both sides of the graph (the vertical axis). The patient's SF height measures 21 cm.
3. Knowing the gestational age and the SF height, the SF height for the gestational age can be plotted on the graph and should be recorded by

making a dot. A small circle is drawn around the dot to make sure that it is clearly seen.

4. The date of the antenatal visit should be written at the top of the card in the square opposite the gestational age of the patient.
5. The person recording the observations on the antenatal card must also write her or his name next to the date.
6. The method whereby the gestational age was determined must now be ticked in the appropriate block at the top left-hand corner of the chart. In this case 'Dates' should be ticked.
7. Between 18 and 36 weeks the SF height in centimetre should be plotted on the SF curve to determine the gestational age in weeks. If the fundal height is at the level of the umbilicus or higher, and the SF height differs from the gestational age by 4 weeks or more, the SF height should be plotted as described in G.

D Plotting the SF height for the first time when the patient does not know the date of her last menstrual period

1. The patient's SF height measures 27 cm. Plot the measurement on the 50th centile opposite the 27 cm on the vertical axis.
2. By plotting the SF height measurement on the 50th centile you are assuming that the fetus is growing normally and that the measurement on the horizontal axis represents the approximate gestational age. In this case the approximate gestational age is 29 weeks.
3. The method whereby the gestational age was determined must now be ticked in the appropriate block at the top left-hand corner of the chart. In this case 'SF-measurement' should be ticked.
4. The fundal growth must be carefully recorded at the following visits. If little or no growth occurs in the next 4 weeks, the diagnosis of intra-uterine growth restriction must be made. If excessive growth occurs, multiple pregnancy must be excluded. Normal growth with the SF-height between the 90th and 10th centiles confirms a normal growing singleton pregnancy.

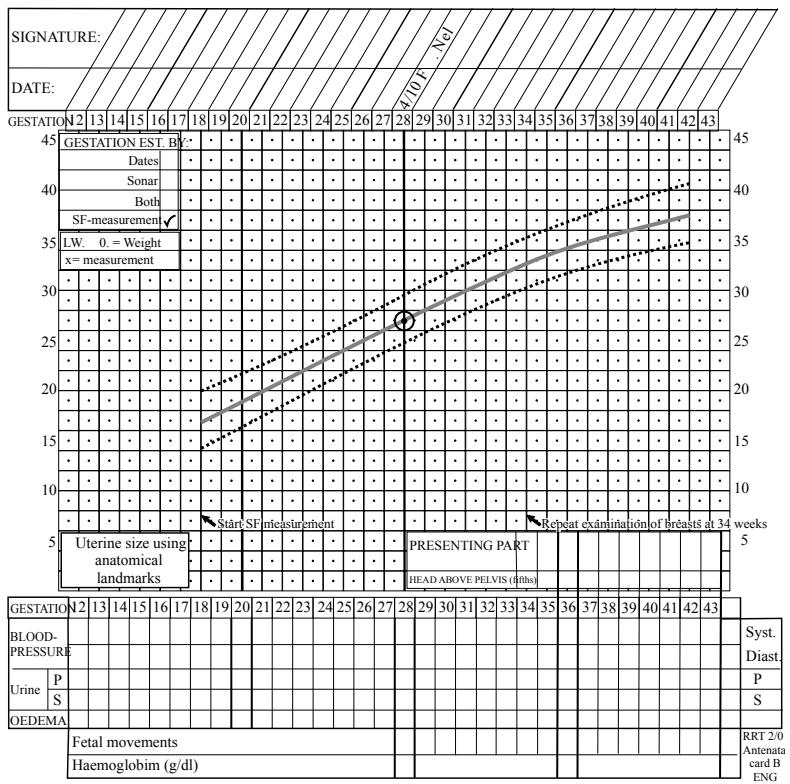


Figure 2A-3: Recording the SF height of 27 cm on the 50th centile when a patient could not remember the date of her last menstrual period. The patient attended the antenatal clinic on 4th October.

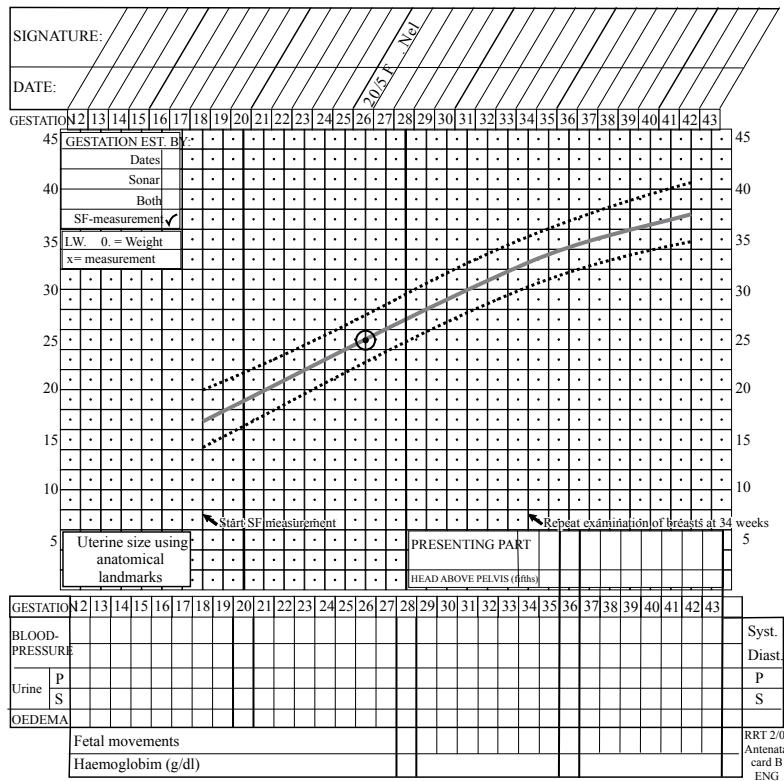


Figure 2A-4: A patient's gestational age, according to her last menstrual period, is 31 weeks and the S-F height measurement is 25 cm.

E The first recording of the SF height when the duration of pregnancy, as determined by her last normal menstrual period, differs from that determined by the SF height by 4 or more weeks.

1. According to the patient's last menstrual period, she is 31 weeks pregnant. The SF height measurement is 25 cm which indicates a gestational age of 26 weeks if plotted on the 50th centile of the SF curve.
 2. In this case the fundal height is above the umbilicus, and the gestational age estimated from the mother's last menstrual period and the SF height differ by 5 weeks. The SF height probably indicates the true gestational age. Make a

mark on the 50th centile opposite 25 cm. This indicates an estimated gestational age of 26 weeks.

3. The method by which the gestational age is estimated must be recorded in the box at the top left-hand corner of the growth chart. In this case a tick should be made opposite 'SF measurement'.
4. The fundal growth must be carefully recorded at the following visits. If little or no growth occurs in the next 4 weeks, the diagnosis of intra-uterine growth restriction must be made. If excessive growth occurs, multiple pregnancy must be excluded. Normal growth with the SF-height between the 90th and 10th centiles confirms a normal growing singleton pregnancy. This information also confirms that using the SF-height to determine gestational age was correct.

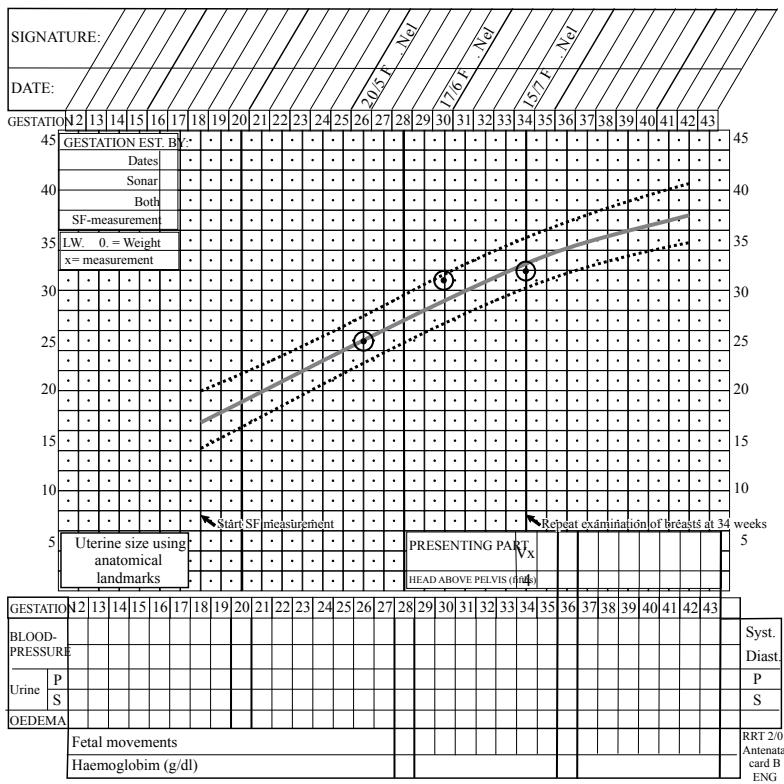


Figure 2A-5: A patient's SF height measurement is 30 cm, 4 weeks after her last visit. Four weeks later the SF height is 32 cm.

F Plotting the symphysis-fundus height at subsequent antenatal visits

The symphysis-fundus height must be plotted on the graph at every subsequent antenatal clinic visit. As before, the symphysis-fundus height measurement and the gestational age are used to determine where the dot should be made on the graph. For example, if the patient's present visit is 4 weeks after she last attended the antenatal clinic, the S-F height measurement must be plotted 4 weeks later on the graph.

G Recording the presenting part and the amount of fetal head palpable above the brim of the pelvis

From 34 weeks gestation onwards the lie and the presenting part must be determined at every visit (as described in Skills Workshop 1-2). The presenting part may be a vertex or breech. If the presenting part is a fetal head, then the amount of head above the pelvic brim must be determined.

H Writing notes on the antenatal record card

A space is provided on the antenatal card for brief notes. A block is also provided for a problem list. Few notes are needed and usually there are no notes in patients who are assessed as being low risk with normal pregnancies.

Date	PROBLEM LIST
1 20/5	Grande multipara
2 20/5	Gestational diabetes
3 23/6	Pre-eclampsia
4	
5	
Date	NOTES (essential facts only)
20/5	Diabetes to be managed with diet
23/6	Good diabetic control Admit to ward for PET assessment and management Requests tubal ligation

Figure 2A-6: A problem list with short notes

3

Hypertensive disorders of pregnancy

Before you begin this unit, please take the corresponding test to assess your knowledge of the subject matter. You should redo the test after you've worked through the unit, to evaluate what you have learned.

Objectives

When you have completed this unit you should be able to:

- Define and diagnose the hypertensive disorders of pregnancy.
- Give a simple classification of the hypertensive disorders of pregnancy.
- Diagnose pre-eclampsia and chronic hypertension.
- Explain why the hypertensive disorders of pregnancy must always be regarded as serious.
- List which patients are at risk of developing pre-eclampsia.
- List the complications of pre-eclampsia.
- Differentiate pre-eclampsia from severe pre-eclampsia.
- Provide emergency management for a patient with pre-eclampsia.
- Provide emergency management for eclampsia.
- Manage gestational hypertension and chronic hypertension during pregnancy.

The hypertensive disorders of pregnancy

3-1 What is the normal blood pressure during pregnancy?

The normal systolic blood pressure is less than 140 mm Hg and the diastolic blood pressure is less than 90 mm Hg.

3-2 What is hypertension during pregnancy?

Hypertension during pregnancy is defined as a diastolic blood pressure of 90 mm Hg or more and/or a systolic blood pressure of 140 mm Hg or more.

A diastolic blood pressure of 90 mm Hg or more and a systolic blood pressure of 140 mm Hg or more during pregnancy is abnormal.

During pregnancy an abnormally high blood pressure is often accompanied by proteinuria.

3-3 What is proteinuria?

Proteinuria is defined as an excessive amount of protein in the urine.

Normally the urine contains no protein or only a trace of protein. Therefore, a trace of protein in the urine is not regarded as abnormal.

Proteinuria during pregnancy is diagnosed when 1+ or more protein as measured with a reagent strip (e.g. Albustix, Labstix, Uristix, Multistix, Lenstrip, etc).

Proteinuria during pregnancy may also be caused by:

1. A urinary tract infection.
2. Renal disease.
3. Contamination of the urine by a vaginal discharge.

Patients with proteinuria must be asked to collect a second sample, as a midstream specimen of urine (MSU). The correct method of collecting an MSU must be carefully explained to the patient. The amount of proteinuria present in the MSU must be recorded in the notes. The further management will be dictated by the amount of proteinuria in the MSU.

1+ or more protein in the urine is abnormal.

3-4 What is pre-eclampsia?

Pre-eclampsia presents with hypertension and proteinuria which develop in the second half of pregnancy (20 weeks or more). Pre-eclampsia may present during pregnancy, labour or the puerperium.

Pre-eclampsia is also called gestational (pregnancy induced) proteinuric hypertension.

3-5 What is gestational hypertension?

In contrast to pre-eclampsia, gestational hypertension is not accompanied by proteinuria but also presents in the second half of pregnancy. Should proteinuria develop in a patient with gestational hypertension, the diagnosis must be changed to pre-eclampsia.

Pre-eclampsia presents with hypertension and proteinuria in the second half of pregnancy.

3-6 What is chronic hypertension?

Chronic hypertension is hypertension, with or without proteinuria, that presents during the first half of pregnancy. There is usually a history of hypertension before the start of the pregnancy.

3-7 What is chronic hypertension with superimposed pre-eclampsia?

This is hypertension presenting during the first half of pregnancy that is complicated by the appearance of proteinuria during the second half of pregnancy. In other words it is chronic hypertension that is complicated by the development of pre-eclampsia.

3-8 What is eclampsia?

Eclampsia is a serious complication of pre-eclampsia that presents with convulsions during pregnancy, labour or the first 7 days of the puerperium. Convulsions can also be the result of other causes, e.g. epilepsy, but the possibility of eclampsia must be carefully ruled out whenever convulsions occur.

Pre-eclampsia

Pre-eclampsia is the hypertensive disorder of pregnancy which occurs most commonly and also causes most problems for the mother and fetus.

Gestational proteinuric hypertension and chronic hypertension with superimposed pre-eclampsia will be discussed under the heading ‘pre-eclampsia’ because the management is similar.

3-9 How frequently does pre-eclampsia occur?

In the Western Cape of South Africa 5–6% of all pregnant women develop pre-eclampsia.

3-10 Is pre-eclampsia a danger to the mother?

Yes, it is one of the most important causes of maternal death in most parts of southern Africa.

3-11 What are the maternal complications of pre-eclampsia?

The most important complications of pre-eclampsia are also important causes of maternal death during pregnancy:

1. Intracerebral haemorrhage.
2. Eclampsia.

3-12 Which patients are at an increased risk of intracerebral haemorrhage?

The risk of intracerebral haemorrhage is especially high if the diastolic blood pressure is 110 mm Hg or more and/or a systolic blood pressure of 160 mm Hg or more.

3-13 Does eclampsia only occur at a very high diastolic blood pressure?

No, eclampsia can occur at a much lower blood pressure, especially in young patients.

3-14 Why is pre-eclampsia a danger to the fetus and newborn infant?

Pre-eclampsia is an important cause of perinatal death because:

1. Preterm delivery is often necessary because of a deterioration in the maternal condition or the development of fetal distress.
2. Abruptio placenta is more common in patients with pre-eclampsia and often results in an intra-uterine death.
3. Pre-eclampsia is associated with decreased placental blood flow. As a result of decreased placental blood flow the fetus may suffer from:
 - Intra-uterine growth restriction or wasting.
 - Fetal distress.

Pre-eclampsia may result in intra-uterine growth restriction, fetal distress, preterm delivery and intra-uterine death.

3-15 How can the severity of pre-eclampsia be graded?

The severity of pre-eclampsia can be graded by:

1. The diastolic blood pressure and/or systolic.
2. The amount of proteinuria.
3. Signs and symptoms of imminent eclampsia.
4. The presence of convulsions.

Patients with pre-eclampsia can be divided into 4 grades of severity:

1. **Pre-eclampsia.** A diastolic blood pressure of 90 to 109 mm Hg and proteinuria, and/or a systolic blood pressure of 140 to 159 mm Hg, plus proteinuria.
2. **Severe pre-eclampsia.** Any of the following:
 - A diastolic blood pressure of 110 mm Hg or more and/or a systolic blood pressure of 160 mm Hg or more on 2 occasions, 4 hours apart, plus proteinuria.
 - A diastolic blood pressure of 120 mm Hg or more and/or a systolic blood pressure of 170 mm Hg or more on 1 occasion, plus proteinuria.
3. **Imminent eclampsia.** These patients have symptoms and/or signs that indicate that they are at extremely high risk of developing eclampsia at any

moment. The diagnosis does not depend on the degree of hypertension or the amount of proteinuria present.

4. **Eclampsia:** Eclampsia is diagnosed when a patient with any of the grades of pre-eclampsia has a convulsion.

If there is any doubt about the grade of pre-eclampsia, the patient should always be placed in the more severe grade.

Patients who improve on bed rest should be kept in the grade of pre-eclampsia which they were given at the initial evaluation. Further management should be in accordance with this grade.

3-16 What are the symptoms and signs of imminent eclampsia?

The **symptoms** are:

1. Headache.
2. Visual disturbances or flashes of light seen in front of the eyes.
3. Upper abdominal pain, in the epigastrium and/or over the liver.

The **signs** are:

1. Tenderness over the liver.
2. Increased tendon reflexes, e.g. knee reflexes.

The diagnosis of imminent eclampsia is made even if only one of the symptoms or signs is present, irrespective of the blood pressure or the amount of proteinuria.

3-17 How common is eclampsia?

In the Western Cape of South Africa the incidence of eclampsia is 1 per 1000 pregnancies.

Patients at increased risk of pre-eclampsia

3-18 Which patients are at an increased risk of pre-eclampsia?

1. Primigravidas.
2. Patients with chronic hypertension.
3. Patients over 34 years.
4. Patients with a multiple pregnancy.
5. Diabetics.
6. Patients with a past history of a pregnancy complicated by pre-eclampsia, especially if the pre-eclampsia developed during the late 2nd or early 3rd trimester.
7. Patients who develop generalised oedema, especially facial oedema.

3-19 What advice should be given to patients at increased risk of pre-eclampsia?

They must be told about the symptoms of imminent eclampsia, and advised to contact the clinic or hospital immediately, if these symptoms appear.

3-20 What special care should be given to patients at increased risk of pre-eclampsia?

In the second half of pregnancy, the following must be carefully watched for:

1. A rise in diastolic blood pressure.
2. Proteinuria.
3. Symptoms and signs of imminent eclampsia.

Patients with an obstetric history of pre-eclampsia that developed late in the second or early in the third trimester, must receive 75 mg aspirin (a quarter Disprin) daily from a gestational age of 14 weeks. This will reduce the risk that pre-eclampsia may develop.

3-21 What should you do if a patient develops generalised oedema, but remains normotensive and does not have proteinuria?

1. She should rest as much as possible.
2. She should be followed up weekly at the antenatal clinic and carefully checked for the development of hypertension and proteinuria.
3. She should carefully monitor the fetal movements.

The management of pre-eclampsia

3-22 What should you do if a patient develops pre-eclampsia?

1. A patient with pre-eclampsia must be admitted to hospital. Such a patient may safely be cared for in a level 1 hospital.
2. Methyldopa (Aldomet) must be prescribed to control the blood pressure.

All patients with pre-eclampsia must be admitted to hospital, irrespective of the level of the blood pressure.

The emergency management of severe pre-eclampsia and imminent eclampsia

The management of patients with severe pre-eclampsia and imminent eclampsia is the same and consists of stabilising the patient, followed by referral to a level 2 or 3 hospital.

3-23 What are the two greatest dangers to the patient with severe pre-eclampsia?

The two greatest dangers, which are a threat to the patient's life, are eclampsia and an intracerebral haemorrhage.

3-24 How should you manage a patient with severe pre-eclampsia or imminent eclampsia?

The main aims of management are to:

1. Prevent eclampsia, by giving magnesium sulphate.
2. Prevent intracerebral haemorrhage, by decreasing the blood pressure with oral nifedipine capsules (Adalat) or parenteral dihydralazine (Nepresol).

The initial management of severe pre-eclampsia and imminent eclampsia is aimed at the prevention of eclampsia and intracerebral haemorrhage.

The steps in the management of severe pre-eclampsia are:

Step 1

An intravenous infusion is started (Balsol or Ringer's lactate) and magnesium sulphate is administered as follows:

1. Give 4 g slowly intravenously over 10 minutes. Prepare the 4 g by adding 8 ml 50% magnesium sulphate (i.e. 2 ampoules) to 12 ml sterile water.
2. Then give 5 g (i.e. 10 ml 50% magnesium sulphate) by deep intramuscular injection into each buttock.

A total of 14 g of magnesium sulphate is, therefore, given.

Step 2

After the magnesium sulphate has been administered, a Foley's catheter is inserted into the patient's bladder, to monitor the urinary output.

Step 3

After giving the magnesium sulphate the blood pressure must be measured again. Magnesium sulphate may cause a slight drop in blood pressure. If the diastolic blood pressure is still 110 mg Hg or more and/or the systolic blood pressure 160 mm Hg or more, oral nifedipine (Adalat) or dihydralazine (Nepresol) is given as follows:

1. Give 10 mg (one capsule) nifedipine orally or 6.25 mg dihydralazine by intramuscular injection.
2. The patient's blood pressure is taken every 5 minutes for the next 30 minutes.

3. If the blood pressure drops too much, intravenous Balsol or Ringer's lactate is administered rapidly, until the blood pressure returns to normal.
4. If the blood pressure does not drop, patients who have received 10 mg nifedipine can be given a second dose of 10 mg nifedipine orally if the diastolic blood pressure remains 110 mm Hg or more or a systolic blood pressure of 160 mm Hg or more after 30 minutes. If necessary, 10 mg nifedipine orally can be repeated half hourly up to a maximum dose of 50 mg.

Or

If dihydralazine was used, an ampoule of dihydralazine (25 mg) should be mixed with 20 ml of sterile water. Bolus doses of 2 ml (2.5 mg) are then given slowly intravenously at 20 minute intervals until the diastolic blood pressure drops below 110 mm Hg.

Nifedipine 10 mg capsules must always be given orally in pregnancy and not given sublingually (under the tongue). The 10 mg capsules must not be confused with Adalat XL tablets which are slowly dissolved and not suitable for rapidly lowering the blood pressure.

Step 4

When the blood pressure is controlled, the patient is transferred to a level 2 or 3 hospital.

Patients with severe pre-eclampsia or imminent eclampsia must always be stabilised before they are transferred.

3-25 What can be done to ensure maximal safety for the patient during her transfer to hospital?

1. A doctor or registered nurse/midwife should accompany the patient.
2. Resuscitation equipment, together with magnesium sulphate, calcium gluconate and nifedipine or dihydralazine, must be available in the ambulance. Respiration may be depressed if a large dose of magnesium sulphate is given too rapidly. Calcium gluconate is the antidote to be given in the event of an overdose of magnesium sulphate.
3. Convulsions must be watched for and the patient's blood pressure must also be carefully observed.

4. If the patient begins to convulse in the ambulance, she must be given a further 2 g of magnesium sulphate intravenously. The dose may, if required, be repeated once. (Make up the solution beforehand and keep it ready in a 20 ml syringe). Further maintenance doses of magnesium sulphate must be given if more than 4 hours pass after the loading dose.
5. If the blood pressure again rises to 110 mm Hg or more while the patient is being transported, you should give a second dose of 10 mg nifedipine by mouth or 6.25 mg dihydralazine intramuscularly. Remember that, with every administration of dihydralazine, there is a danger that the patient may become hypotensive. Another side-effect is tachycardia, and if the pulse rate rises to 120 beats per minute or above, further administration of dihydralazine must be stopped.

The management of eclampsia

3-26 What is your immediate management if a patient convulses?

The management of eclampsia is as follows:

Step 1

Prevent aspiration of the stomach contents by:

- Turning the patient immediately on her side.
- Keeping the airway open by suctioning (if necessary) and inserting an airway.
- Administering oxygen.

Step 2

Stop the convulsion and prevent further convulsions by putting up an intravenous infusion of Balsol or Ringer's lactate and giving magnesium sulphate.

Step 3

After the magnesium sulphate has been given, insert a Foley's catheter to monitor the urinary output.

Step 4

If the diastolic blood pressure is 110 mm Hg or more and/or the systolic blood pressure 160 mm Hg or more, it must be reduced with dihydralazine (Nepresol). Oral nifedipine can be used if the patient is fully conscious after the convulsion.

Step 5

The patient must now be urgently transferred to a level 2 or 3 hospital.

Eclampsia is a life-threatening condition for both the mother and the fetus. Immediate management is, therefore, needed.

3-27 What should you do if the patient convulses again?

If the patient convulses again, after the convulsions had initially been controlled by the total loading dose of 14 g of magnesium sulphate, a further 2 g of magnesium sulphate should be administered intravenously. This dose can be repeated once more in the unlikely event of the patient having yet a further convulsion.

Gestational hypertension

3-28 What should you do if a patient develops gestational hypertension?

A patient with a slightly elevated blood pressure (a diastolic blood pressure of 90 to 95 mm Hg), which develops in the second half of pregnancy, in the absence of proteinuria, may be managed in a level 1 hospital or clinic. If the home circumstances are poor, she must be admitted to hospital, for bedrest. Where the home circumstances are good, the patient is allowed bedrest at home, under the following conditions:

1. The patient must be told about the symptoms of imminent eclampsia. Should any of these occur, she must contact or attend the hospital or clinic immediately.
2. The patient must be seen weekly at a high-risk antenatal clinic. In addition, following the initial diagnosis, she must be seen once between visits, to check the blood pressure and test the urine for protein.
3. If the patient cannot be seen more frequently, she must be given urinary reagent strips to take home. She must then test her urine daily and go to the clinic, should there be 1+ proteinuria or more.
4. No special investigations are indicated.
5. Alpha methyldopa (Aldomet) must be prescribed to control the blood pressure. The initial dosage is 500 mg 8 hourly.

Patients with a diastolic blood pressure of 100 mm Hg or more and/or a systolic blood pressure of 160 mm Hg or more must be admitted to hospital and alpha methyldopa (Aldomet) must be prescribed. Once the diastolic blood pressure has dropped below 100 mm Hg and the systolic blood pressure to below 160 mm Hg, they are managed as indicated above.

3-29 How should you monitor the fetus, in order to ensure fetal wellbeing?

Fetal movements must be counted and recorded twice daily. If available the patient should be referred for a Doppler measurement of the blood flow in the umbilical artery to determine placental function.

3-30 When should you deliver a patient with gestational hypertension?

If the blood pressure remains well controlled, no proteinuria develops and the fetal condition remains good, the pregnancy must be allowed to continue until 40 weeks when induction of labour must be done.

Chronic hypertension

These patients have hypertension in the first half of pregnancy, or are known to have had hypertension before the start of pregnancy. They do not have superimposed pre-eclampsia.

3-31 Which patients with chronic hypertension should be referred to a level 2 or 3 hospital?

A good prognosis can be expected if:

1. Renal function is normal (normal serum creatinine concentration).
2. Pre-eclampsia is not superimposed on the chronic hypertension.
3. The blood pressure is well controlled (a diastolic blood pressure of 90 mm Hg or less and a systolic blood pressure of 140 mm Hg or less) from early in pregnancy.

Therefore, these women can be managed at a level 1 hospital. However, women with chronic hypertension should be referred to a level 2 or 3 hospital for further management if:

1. Renal function is abnormal (serum creatinine more than 120 mmol/l).
2. Proteinuria develops.
3. The diastolic blood pressure is 110 mm Hg or higher more and systolic blood pressure 160 mm Hg or more.
4. There is intra-uterine growth restriction.
5. More than one drug is required to control the blood pressure.

3-32 Will you adjust the medication of a patient with chronic hypertension when she becomes pregnant?

Yes, she must be put onto alpha methyldopa (Aldomet) 500 mg 8 hourly. Other antihypertensives (i.e. diuretics, beta blockers and ACE inhibitors) must be stopped.

3-33 What special care is needed for a patient with chronic hypertension during pregnancy?

1. Any rise in the blood pressure or the development of proteinuria must be carefully looked for, as they indicate an urgent need for referral.
2. A Doppler measurement of the blood flow in the umbilical artery to determine placental function should be done.
3. Postpartum sterilisation must be discussed with the patient, and is recommended when the patient is a multigravida.

3-34 When should you deliver a patient with chronic hypertension?

The management is the same as that for gestational hypertension.

Case study 1

A 21 year old primigravid patient has attended the antenatal clinic and her pregnancy progresses normally to 33 weeks. At the next visit at 35 weeks, the patient complains that her hands and feet have started to swell over the past week. On examination, you notice that her face is also slightly swollen. Her blood pressure is 120/80, which is the same as at her previous visit, and she has no proteinuria. She reports that her fetus moves frequently.

1. Why is this patient at high risk of developing pre-eclampsia?

Because she is a primigravida and has developed generalised oedema over the past week.

2. How should this patient be managed further?

She should rest a lot. She also should be seen at the antenatal clinic again in a week when she must be carefully examined for a rise in blood pressure or the presence of proteinuria.

3. What advice should this patient be given?

She should be told about the symptoms of imminent eclampsia, i.e. headache, flashes of light before the eyes, and upper abdominal pain. She should also be asked to count and record fetal movements twice a day. If any of the above-mentioned symptoms are experienced, or if fetal movements decrease, she must immediately report to the clinic or hospital.

4. When you see the patient a week later she has a diastolic blood pressure of 90 mm Hg, but there is still no proteinuria. How should she be managed further?

The patient has pregnancy-induced hypertension. If the home conditions are satisfactory, she can be managed with bedrest at home. The hypertension must be controlled with alpha methyldopa (Aldomet). She must be seen twice a week, and carefully monitored, to detect a rise in the blood pressure and the possible development of proteinuria. If the blood pressure rises and/or proteinuria develops, she must be referred to hospital for admission. If the home conditions are poor, she should be admitted to hospital for bed rest.

Case study 2

At an antenatal clinic you see a patient who is 39 weeks pregnant. Up until now she has had a normal pregnancy. On examination, you find that her diastolic blood pressure is 95 mm Hg and that she has 2+ proteinuria.

1. How should this patient be managed?

She should be transferred to hospital as all patients with 2+ proteinuria must be hospitalised.

2. On examining this patient you observe that she has increased patellar reflexes, i.e. brisk knee jerks. How should this observation alter her management?

Increased tendon reflexes are a sign of imminent eclampsia. The diagnosis must be made, irrespective of the degree of hypertension or the amount of

proteinuria. To prevent the development of eclampsia, the patient must be given magnesium sulphate.

3. What is the danger to this patient's health?

The patient has severe pre-eclampsia. Therefore, the immediate danger to her life is the development of eclampsia or an intracerebral haemorrhage.

4. How should this patient be managed?

Her clinical condition must first be stabilised. An intravenous infusion should be started and a loading dose of 14 g magnesium sulphate must be given. This should prevent the development of eclampsia. A Foley's catheter must be inserted in her bladder.

5. Is a loading dose of magnesium sulphate also adequate to control the high blood pressure?

No. Sometimes with severe pre-eclampsia, the diastolic blood pressure will drop to below 110 mm Hg after a loading dose of magnesium sulphate has been given. In that case, no further management is needed for the hypertension. However, if the patient's blood pressure does not drop after administering the magnesium sulphate, 10 mg (one capsule) oral nifedipine (Adalat) or intramuscular dihydralazine (Nepresol) 6.25 mg should be given.

Case study 3

While working at a level 1 hospital you admit a patient with a diastolic blood pressure of 120 mm Hg and 3+ proteinuria. She is 32 weeks pregnant. On further questioning and examination she has no symptoms or signs of imminent eclampsia.

1. What is the danger to this patient's health?

The patient has severe pre-eclampsia. Therefore, the immediate danger to her life is the development of eclampsia or an intracerebral haemorrhage.

2. How should this patient be managed?

Her clinical condition must first be stabilised. An intravenous infusion should be started and a loading dose of 14 g magnesium sulphate must be given. This should prevent the development of eclampsia.

3. Is a loading dose of magnesium sulphate also adequate to control the high blood pressure?

No. Sometimes, the diastolic blood pressure will drop to below 110 mm Hg after a loading dose of magnesium sulphate has been given. In that case, no further management is needed for the hypertension. However, if the patient's blood pressure does not drop after administering the magnesium sulphate, intramuscular dihydralazine (Nepresol) 6.25 mg or 10 mg (one capsule) oral nifedipine (Adalat) should be given.

4. Should you continue to manage this patient at a level 1 hospital?

No. The patient should be transferred to a level 2 or 3 hospital, for further management. Both severe pre-eclampsia and the gestational age (32 weeks) at which the complications developed are reasons for management at least in a level 2 hospital.

Case study 4

A 37 year old, gravida 4, para 3 patient books for antenatal care. She has chronic hypertension and is managed with a diuretic. By dates and examination she is 14 weeks pregnant.

1. Should the management of the patient's hypertension be changed during the pregnancy?

Yes. The diuretic should be stopped, as these drugs are not completely safe during pregnancy. Instead, the patient should be treated with alpha methyldopa (Aldomet).

2. What factors indicate a good prognosis for a patient with chronic hypertension during pregnancy?

Normal renal function, no superimposed pre-eclampsia and good control of the blood pressure during pregnancy.

3. How can superimposed pre-eclampsia be diagnosed during pregnancy?

The patient will develop proteinuria and/or a rise in blood pressure during the second half of pregnancy.

4. Why is it important to detect superimposed pre-eclampsia in a patient with chronic hypertension?

Because the risk of complications increases. As a result a preterm delivery may be necessary. The patient should, therefore, be transferred to a level 2 or 3 hospital if superimposed pre-eclampsia develops.

5. What should be seriously recommended during the puerperium in this patient?

A postpartum sterilisation. Postpartum sterilisation should be discussed with the patient during the pregnancy. Postpartum sterilisation is particularly important as the patient is a 37 year old multipara with chronic hypertension.

Skills workshop 3A: Measuring blood pressure and proteinuria

Objectives

When you have completed this skills workshop you should be able to:

- Measure the blood pressure.
- Measure the amount of protein in the urine.

Measuring blood pressure

A The standardised method of measuring blood pressure

The following are important if you want to measure the blood pressure accurately:

1. The right upper arm is used.
2. The arm must be taken out of the sleeve.
3. The patient should lie on her right side with a 30 degree lateral tilt or sit in a chair.
4. Take the blood pressure after a 5 minute period of rest.
5. The cuff must be applied correctly. If the patient is sitting in a chair, the blood pressure apparatus must be at the same level as her upper arm.
6. The systolic blood pressure is taken at Korotkoff phase 1.
7. The diastolic blood pressure is taken at Korotkoff phase 5.

The patient should lie on her right side or sit when her blood pressure is measured.

B Use the right arm

The examination couches in most clinics stand with their left side against a wall as it is most convenient for a right-handed person to examine the right side of the patient. The lower arm (i.e. the right arm if she is lying on her right side) should be used, as the upper arm will give false low readings as it is above the level of the heart. The arm must be fully undressed so that the cuff can be correctly applied.

C The patient must not lie on her back

The patient should lie down on her side or sit. Lying on her back may cause hypotension, giving a falsely low reading. She should also lie slightly turned onto her side. Lying on her back may cause the uterus to press on the inferior

vena cava resulting in a decreased return of blood to the heart and a drop in blood pressure. A false low blood pressure may, therefore, be recorded.

D Allow the patient to rest for 5 minutes before measuring the blood pressure

Anxiety and the effort of climbing onto the couch often increases the blood pressure. This will usually return to a resting value if the patient can lie down and relax for 5 minutes.

E How to apply the cuff

A standard size cuff (width of 14.5 cm) is usually used. If the arm is very fat, then use a wide cuff (17.5 cm) to get a correct reading. The cuff must be applied firmly around the arm, not allowing more than 1 finger between the cuff and the patient's arm.

F Listening to the pulse

The cuff should be pumped up with a finger feeling the brachial or radial pulse. Only when the pulse can no longer be felt, should the stethoscope be put over the brachial pulse and the pressure released slowly.

G Recognising the Korotkoff phases 1 and 5

The Korotkoff phases are times when the sound of the pulse changes during the measurement of the blood pressure:

Phase 1 is the first sound which you hear after the cuff pressure is released. This indicates the systolic pressure.

Phase 5 is the time when the sound of the pulse disappears. Usually the sound gets softer before it disappears but sometimes it disappears without first becoming softer at the same time. However, in all cases the diastolic blood pressure must be read when the sound of the pulse disappears.

Measuring proteinuria

H Measuring the amount of proteinuria

The amount of protein in a sample of urine is simply and easily measured with a plastic, reagent strip.

I Grading the amount of proteinuria

Using a reagent strip the amount of proteinuria is graded as follows:

1+	=	0.3 g/l
2+	=	1.0 g/l
3+	=	3.0 g/l
4+	=	10 g/l

Remember that a trace (0.1g/l) of protein is not regarded as significant proteinuria and may occur normally.

J The use of a reagent strip to measure the amount of proteinuria

1. Collect a fresh specimen of urine.
2. Remove a reagent strip from the bottle and replace the cap.
3. Dip the strip into the urine so that all the test areas are completely covered, then immediately remove the strip.
4. Wait 60 seconds.
5. Hold the strip horizontally and compare with the colour blocks on the side of the bottle. Hold the strip close to the bottle to match the colours but do not rest it on the bottle as the urine will damage the colour chart. The darker the colour of the reagent strip, the greater is the amount of proteinuria.

K Reagent strips can give a false reading

Reagent strips may incorrectly assess the degree of proteinuria if the urine is very concentrated or very dilute. Do not use the first urine passed in the morning as it may be concentrated and, therefore, give a falsely high reading.

4

Antepartum haemorrhage

Before you begin this unit, please take the corresponding test to assess your knowledge of the subject matter. You should redo the test after you've worked through the unit, to evaluate what you have learned.

Objectives

When you have completed this unit you should be able to:

- Understand why an antepartum haemorrhage should always be regarded as serious.
- Provide the initial management of a patient presenting with an antepartum haemorrhage.
- Diagnose the most likely cause of the bleeding from the history and examination of the patient.
- Know how to manage a patient with a slight vaginal bleed mixed with mucus.
- Diagnose the cause of a blood-stained vaginal discharge and provide appropriate treatment.

Antepartum haemorrhage

4-1 What is an antepartum haemorrhage?

An antepartum haemorrhage is any vaginal bleeding which occurs at or after 24 weeks (estimated fetal weight at 24 weeks = 500 g) and before the birth of the infant. A bleed before 28 weeks is regarded as a threatened miscarriage as the fetus is usually considered not to be viable.

4-2 Why is an antepartum haemorrhage such a serious condition?

1. The bleeding can be so severe that it can endanger the life of both the mother and fetus.
2. Abruptio placenta is a common cause of antepartum haemorrhage and an important cause of perinatal death in many communities.

Therefore, all patients who present with an antepartum haemorrhage must be regarded as serious emergencies until a diagnosis has been made. Further management will depend on the cause of the haemorrhage.

Any vaginal bleeding during pregnancy may be an important danger sign that must be reported immediately.

4-3 What advice about vaginal bleeding should you give to all patients?

Every patient must be advised that any vaginal bleeding is potentially serious and told that this complication must be reported immediately.

4-4 What is the management of an antepartum haemorrhage?

The management consists of 4 important steps that should be carried out in the following order:

1. The maternal condition must be evaluated and stabilised, if necessary.
2. The condition of the fetus must then be assessed.
3. The cause of the haemorrhage must be diagnosed.
4. Finally, the definitive management of an antepartum haemorrhage, depending on the cause, must be given.

It must also be decided whether the patient should be transferred for further treatment.

The initial, emergency management of antepartum haemorrhage

The management must always be provided in the following order:

1. Assess the condition of the patient. If the patient is shocked, she must be resuscitated immediately.
2. Assess the condition of the fetus. If the fetus is viable but distressed, an emergency delivery is needed.
3. Diagnose the cause of the bleeding, taking the clinical findings into account and, if necessary, the results of special investigations.

4-5 What symptoms and signs indicate that the patient is shocked due to blood loss?

1. Dizziness is the commonest symptom of shock.
2. On general examination the patient is sweating, her skin and mucous membranes are pale, and she feels cold and clammy to touch.
3. The blood pressure is low and the pulse rate fast.

4-6 How should you manage a shocked patient with an antepartum haemorrhage?

When there are symptoms and signs to indicate that the patient is shocked, you must:

1. Put up two intravenous infusions ('drips') with Balsol or Ringer's lactate, to run in quickly in order to actively resuscitate the patient.
2. Insert a Foley's catheter into the patient's bladder, to measure the urinary volume and to monitor further urine output.
3. If blood is available, take blood for cross-matching at the time of putting up the intravenous infusion and order 2 or more units of blood urgently.
4. Refer the patient to the hospital.

4-7 What must you do if a patient presents with a life-threatening haemorrhage?

The maternal condition takes preference over that of the fetus. The patient, therefore, is actively resuscitated while arrangements are made to transfer the patient to the hospital. At the hospital an emergency caesarean section or hysterotomy will be performed.

Diagnosing the cause of the bleeding

4-8 Should you treat all patients with antepartum haemorrhage in the same way, irrespective of the amount and character of the bleed?

No. The management differs depending on whether the vaginal bleeding is diagnosed as a 'haemorrhage' on the one hand, or a blood-stained vaginal discharge or a 'show' on the other hand. A careful assessment of the amount and type of bleeding is, therefore, very important.

1. Any vaginal bleeding at or after 24 weeks must be diagnosed as an antepartum haemorrhage if any of the following are present:
 - A sanitary pad is at least partially soaked with blood.
 - Blood runs down the patient's legs.
 - A clot of blood has been passed.

A diagnosis of a haemorrhage always suggests a serious complication.

1. A blood-stained vaginal discharge will consist of a discharge mixed with a small amount of blood.
2. A 'show' will consist of a small amount of blood mixed with mucus. The blood-stained vaginal discharge or 'show' will be present on the surface of the sanitary pad but will not soak it.

If the maternal and fetal conditions are satisfactory, then a careful speculum examination should be done to exclude a local cause of the bleeding. Do NOT

perform a digital vaginal examination, as this may cause massive haemorrhage if the patient has a placenta praevia.

Do not do a digital vaginal examination until placenta praevia has been excluded.

4-9 How does a speculum examination help you determine the cause of the bleeding?

1. Bleeding through a closed cervical os confirms the diagnosis of a haemorrhage.
2. If the cervix is a few centimetres dilated with bulging membranes, or the presenting part of the fetus is visible, this suggests that the bleed was a 'show'.
3. A blood-stained discharge in the vagina, with no bleeding through the cervical os, suggests a vaginitis.
4. Bleeding from the surface of the cervix caused by contact with the speculum (i.e. contact bleeding) may indicate a cervicitis or cervical intra-epithelial neoplasia (CIN).
5. Bleeding from a cervical tumour or an ulcer may indicate an infiltrating carcinoma.

4-10 Can you rely on clinical findings to determine the cause of a haemorrhage?

In many cases the history and examination of the abdomen will enable the patient to be put into one of 2 groups:

1. Abruptio placentae (placental abruption).
2. Placenta praevia.

There are some patients in whom no reason for the haemorrhage can be found. Such a haemorrhage is classified as an antepartum haemorrhage of unknown cause.

4-11 What is the most likely cause of an antepartum haemorrhage with fetal distress?

Abruptio placenta is the commonest cause of antepartum haemorrhage leading to fetal distress or an intra-uterine death. However, sometimes there may be very little or no bleeding even with a severe abruptio placentae.

An antepartum haemorrhage with fetal distress or fetal death is almost always due to abruptio placentae.

4-12 What is the most likely cause of a life-threatening antepartum haemorrhage?

A placenta praevia is the most likely cause of a massive antepartum haemorrhage that threatens the woman's life.

Antepartum bleeding caused by abruptio placentae

4-13 What is abruptio placentae?

Abruptio placentae (placental abruption) means that part or all of a normally implanted placenta has separated from the uterus before delivery of the fetus. The cause of abruptio placentae remains unknown.

4-14 Which patients are at increased risk of abruptio placentae?

Patients with:

1. A history of an abruptio placentae in a previous pregnancy. (There is a 10% chance of recurrence after an abruptio placentae in a previous pregnancy and a 25% chance after 2 previous pregnancies with an abruptio placentae.)
2. Pre-eclampsia (gestational proteinuric hypertension), and to a lesser extent any of the other hypertensive disorders of pregnancy.
3. Intra-uterine growth restriction.

4. Cigarette smoking.
5. Poor socio-economic conditions.
6. A history of abdominal trauma, e.g. a fall or kick on the abdomen.

4-15 What symptoms point to a diagnosis of abruptio placentae?

1. An antepartum haemorrhage which is associated with continuous, severe abdominal pain.
2. A history that the blood is dark red with clots.
3. Absence of fetal movements following the bleeding.

4-16 What do you expect to find on examination of the patient?

1. The general examination and observations show that the patient is shocked, often out of proportion to the amount of visible blood loss.
2. The patient usually has severe abdominal pain.
3. The abdominal examination shows the following:
 - The uterus is tonically contracted, hard and tender, so much so that the whole abdomen may be rigid.
 - Fetal parts cannot be palpated.
 - The uterus is bigger than the patient's dates suggest.
 - The haemoglobin concentration is low, indicating severe blood loss.
4. The fetal heart beat is almost always absent in a severe abruptio placentae.

These symptoms and signs are typical of a severe abruptio placentae.

However, abruptio placentae may present with symptoms and signs which are less obvious, making the diagnosis difficult.

The diagnosis of severe abruptio placentae can usually be made from the history and physical examination.

Antepartum bleeding caused by placenta praevia

4-17 What is placenta praevia?

Placenta praevia means that the placenta is implanted either wholly or partially in the lower segment of the uterus. The placenta may extend down to, or cover the internal os of the cervix. When the lower segment starts to form or the cervix begins to dilate, the placenta becomes partially separated and this causes maternal bleeding.

4-18 Which patients have the highest risk of placenta praevia?

1. With regard to their previous obstetric history, patients who:
 - Are grande multiparas, i.e. who are para 5 or higher.
 - Have had a previous caesarean section.
2. With regard to their present obstetric history, patients who:
 - Have a multiple pregnancy.
 - Have had a threatened abortion, especially in the second trimester.
 - Have an abnormal presentation.

4-19 What in the history of the bleeding suggests the diagnosis of placenta praevia?

1. The bleeding is painless and bright red in colour.
2. Fetal movements are still present after the bleed.

4-20 What are the typical findings on physical examination in a patient with placenta praevia?

1. General examination may show signs that the patient is shocked, and the amount of bleeding corresponds to the degree of shock. The patient's haemoglobin concentration may be normal if done at the time of the haemorrhage or low depending on the amount of blood loss and the time interval between the haemorrhage and the haemoglobin measurement. However, the first bleed is usually not severe.
2. Examination of the abdomen shows that:
 - The uterus is soft and not tender to palpation.
 - The uterus is not bigger than it should be for the patient's dates.
 - The fetal parts can be easily palpated, and the fetal heart is present.
 - There may be an abnormal presentation. Breech presentation or oblique or transverse lies are commonly present.
 - In cephalic presentations, the head is not engaged and is easily ballotable above the pelvis.

The diagnosis of placenta praevia can usually be made from the history and physical examination.

4-21 Do you think that engagement of the head can occur if there is a placenta praevia present?

No. If there is 2/5 or less of the fetal head palpable above the pelvic brim on abdominal examination, then placenta praevia can be excluded and a digital vaginal examination can be done safely. The first vaginal examination must always be done carefully.

Two fifths or less of the fetal head palpable above the pelvic brim excludes the possibility of placenta praevia.

4-22 What do you understand by a 'warning bleed'?

This is the first bleeding that occurs from a placenta praevia, when the lower segment begins to form at about 34 weeks, or even earlier.

4-23 Are there any investigations that can confirm the diagnosis of placenta praevia?

An ultrasound examination must be done in order to localise the placenta, if the patient is **not bleeding actively**.

4-24 What action should you take if a routine ultrasound examination early in pregnancy shows a placenta praevia?

In most cases, the position of the placenta moves away from the internal os of the cervix as pregnancy continues. A follow-up ultrasound examination must be arranged at a gestational age of 32 weeks.

4-25 What is the further management after making the diagnosis of placenta praevia?

Refer the patient to a hospital where she will be admitted and managed conservatively until 36 to 38 weeks depending on the severity of the bleed or until active bleeding starts.

4-26 When you refer a patient, what precautions should you take to ensure the safety of the patient in transit?

1. A shocked patient should have 2 intravenous infusion lines with Balsol or Ringer's lactate running in fast. A doctor should accompany the patient if possible. If not possible, a registered nurse or trained person from the ambulance service should accompany her.
2. A patient who is no longer bleeding, should also have an intravenous infusion, and be accompanied by a registered nurse or a trained person from the ambulance service.

4-27 When would you suspect an antepartum haemorrhage of unknown cause?

In patients who have all the following factors:

1. Mild antepartum haemorrhage when there are no signs of shock and the fetal condition is good.
2. When the history and examination do not suggest a severe abruptio placentae.

3. When local causes of bleeding have been excluded on a speculum examination.
4. When placenta praevia has been excluded by an ultrasound examination.

A blood-stained vaginal discharge

4-28 How does a patient describe a blood-stained vaginal discharge?

As a vaginal discharge mixed with a small amount of blood.

4-29 How does a patient describe a ‘show’?

As a slight vaginal bleed consisting of blood mixed with mucus.

4-30 How should you manage a patient with a history of a blood-stained vaginal discharge or a ‘show’?

1. After getting a good history and ensuring that the condition of the fetus is satisfactory, a careful speculum examination should be done.
2. The speculum is only inserted for 5 cm, carefully opened, and then introduced further until the cervix can be seen.
3. Any bleeding through a closed cervical os indicates an antepartum haemorrhage.
4. A ‘show’ is the most likely cause, if the cervix is a few centimetres dilated, with bulging membranes, or if the presenting part of the fetus is visible.
5. A vaginitis is the most likely cause, if a blood-stained discharge is seen in the vagina.

4-31 How should you treat a blood-stained discharge due to vaginitis in pregnancy?

1. Organisms identified on the cervical cytology smear are the most likely cause of the vaginitis.
2. If no organisms are identified on the cytology smear, or a smear was not done, then Trichomonas vaginalis is most probably present.

To treat a Trichomonal vaginitis, both the patient and her partner should receive a single dose of 2 g metronidazole (Flagyl) orally.

4-32 Should metronidazole be used during pregnancy?

Metronidazole should not be used in the first trimester of pregnancy, unless it is absolutely necessary, as it may cause congenital abnormalities in the fetus. The patient and her partner must be warned that metronidazole causes severe nausea and vomiting if it is taken with alcohol. The risk of congenital abnormalities caused by alcohol may also be increased by metronidazole.

4-33 How do you manage a patient with contact bleeding?

Contact bleeding occurs if the cervix is touched (e.g. during sexual intercourse or during a vaginal examination).

1. When there is normal cervical cytology (Papanicolaou smear), the contact bleeding is probably due to a cervicitis. If it is troublesome, the patient should be given a course of oral erythromycin 500 mg 6 hourly for 7 days.
2. With abnormal cervical cytology, the patient should be correctly managed. Cervical intra-epithelial neoplasia causes contact bleeding.

4-34 What action should you take when the bleeding is from a cervical ulcer or tumour?

The patient most probably has an infiltrating cervical carcinoma and should be correctly managed.

Case study 1

A patient, who is 35 weeks pregnant, presents with a history of vaginal bleeding.

1. Why does this patient need to be assessed urgently?

Because an antepartum haemorrhage should always be regarded as an emergency, until a cause for the bleeding is found. Thereafter, the correct management can be given.

2. What is the first step in the management of a patient with an antepartum haemorrhage?

The clinical condition of the patient must be assessed. Special attention must be paid to signs of shock.

3. What must be done if the patient has a rapid pulse rate and signs of shock?

Put up two intravenous infusions ('drips') with Balsol or Ringer's lactate, to run in quickly in order to actively resuscitate the patient. Insert a Foley's catheter into the patient's bladder, to measure the urinary volume and to monitor further urine output. If blood is available, take blood for cross-matching at the time of putting up the intravenous infusion and order 2 or more units of blood urgently.

4. What is the next step in the management of a patient with an antepartum haemorrhage?

The patient needs to be referred to hospital.

Case study 2

A patient who is 32 weeks pregnant, according to her antenatal card, presents with a history of severe vaginal bleeding and abdominal pain. The blood contains dark clots. Since the haemorrhage, the patient has not felt her fetus move. The patient's blood pressure is 80/60 mm Hg and the pulse rate 120 beats per minute.

1. What is your clinical diagnosis?

The history is typical of an abruptio placentae and most likely she has an intra-uterine death.

2. If the clinical examination confirms the diagnosis, what should be the first step in the management of this patient?

The patient's blood pressure and pulse rate indicate that she is shocked. Therefore, she must first be resuscitated.

3. What is the next step in the management of the patient, that requires urgent attention?

The patient must then be referred to hospital.

4. What precautions should you take to ensure the safety of the patient in transit?

A shocked patient should have 2 intravenous infusion lines with Balsol or Ringer's lactate running in fast. A doctor should accompany the patient if possible. If not possible, a registered nurse should accompany her. A patient who is no longer bleeding, should also have an intravenous infusion, and be accompanied by a registered nurse or a trained person from the ambulance service, whenever possible.

Case study 3

A patient is seen at the antenatal clinic at 35 weeks gestation with a breech presentation. The patient is referred to see the doctor the following week, for an external cephalic version. That evening she has a painless, bright red vaginal bleed.

1. What is your diagnosis?

The history and the presence of an abnormal lie suggest that the bleeding is the result of a placenta praevia.

2. Why is the history typical of a placenta praevia?

The bleeding is painless and bright red. She also has an abnormal lie.

3. What do expect to find in addition to a breech presentation on abdominal examination?

The uterus will be soft, with no tenderness and the size will be appropriate for her gestational age. The presenting part will be high.

4. What should be the initial management of the patient?

The condition of the mother should first be assessed and the patient resuscitated, if necessary. The patient must then be referred to hospital.

Case study 4

A patient books for antenatal care at 30 weeks gestation. When you inform her of the danger signs during pregnancy, she says that she has had a vaginal discharge for the past 2 weeks. At times the discharge has been blood stained.

1. Has this patient had a antepartum haemorrhage?

The history suggests a blood-stained vaginal discharge rather than an antepartum haemorrhage.

2. What is the most probable cause of the blood-stained vaginal discharge?

A vaginitis. This can usually be confirmed by a speculum examination.

3. What is the most likely cause of a vaginitis with a blood-stained discharge?

Trichomonas vaginalis. Therefore, if no organisms were identified on the cervical cytology smear or a smear was not done, Trichomonas vaginalis is presumed to be the cause of the vaginitis.

4. How should you treat a patient with Trichomonal vaginitis?

A single dose of 2 g metronidazole (Flagyl) is given orally to both the patient and her partner. Both must be warned against drinking alcohol for a few days after taking metronidazole.

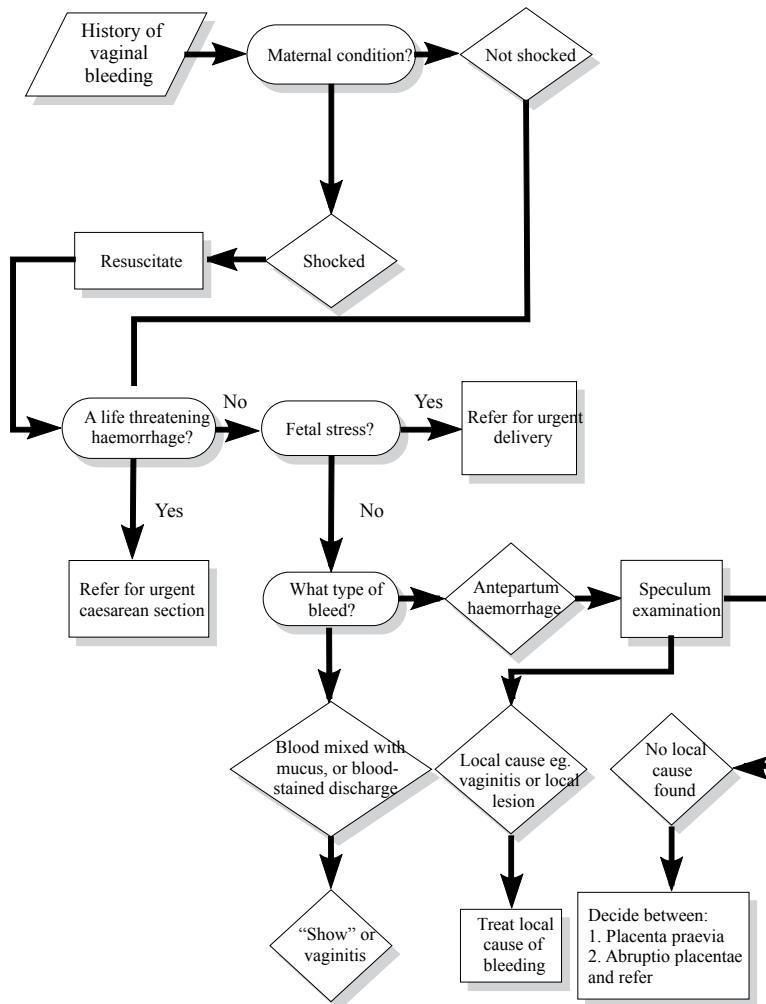


Figure 4-1: Flow diagram: Initial management of a patient with vaginal bleeding

5

Preterm labour and preterm rupture of the membranes

Before you begin this unit, please take the corresponding test to assess your knowledge of the subject matter. You should redo the test after you've worked through the unit, to evaluate what you have learned.

Objectives

When you have completed this unit you should be able to:

- Define preterm labour and preterm rupture of the membranes.
- Understand why these conditions are very important.
- Understand the role of infection in causing preterm labour and preterm rupture of the membranes.
- List which patients are at increased risk of these conditions and what preventive measures should be taken.
- Diagnose preterm labour and preterm rupture of the membranes.
- Initiate the correct management and appropriate referral of patients.

Preterm labour and preterm rupture of the membranes

5-1 What is preterm labour?

Preterm labour is diagnosed when there are **regular uterine contractions before 37 weeks** of pregnancy, together with either of the following:

1. Cervical effacement and/or dilatation.
2. Rupture of the membranes.

5-2 What is preterm rupture of the membranes?

Preterm rupture of the membranes is diagnosed when the **membranes rupture before 37 weeks**, in the absence of uterine contractions.

5-3 What is prelabour rupture of the membranes?

Prelabour rupture of the membranes is defined as **rupture of the membranes for at least one hour before the onset of labour** in a term pregnancy.

5-4 How should you diagnose preterm labour if the gestational age is unknown?

Preterm labour is diagnosed if the estimated fetal weight is below 2500 g. The symphysis-fundus height will be less than 35 cm.

5-5 Why are preterm labour and preterm rupture of the membranes important?

Preterm labour and preterm rupture of the membranes are major causes of perinatal death because:

1. Preterm delivery, especially before 34 weeks, commonly results in the birth of an infant who develops hyaline membrane disease and other complications of prematurity.
2. Preterm labour and preterm rupture of the membranes are often accompanied by bacterial infection of the membranes and placenta, that may cause complications for both the mother and the fetus. The mother and fetus may develop severe infection, which is life threatening.

5-6 What is the commonest known cause of preterm labour and preterm rupture of the membranes?

In many cases the cause is unknown, but increasing evidence points to infection of the membranes and placenta as the commonest known cause of both preterm labour and preterm rupture of the membranes.

Infection of the membranes and placenta is the commonest recognised cause of preterm labour and preterm rupture of the membranes.

5-7 What is infection of the membranes and placenta?

Infection of the membranes and placenta causes an acute inflammation of the placenta, membranes and decidua. This condition is called **chorioamnionitis**. It may occur with intact or ruptured membranes.

Bacteria from the cervix and vagina spread through the endocervical canal to infect the membranes and placenta. Later these bacteria may colonise the liquor, from where they may infect the fetus.

Infection of the membranes and placenta (chorioamnionitis) may occur with either intact or ruptured membranes.

5-8 What is the clinical presentation of chorioamnionitis?

Usually chorioamnionitis is asymptomatic (subclinical chorioamnionitis) and, therefore, the clinical diagnosis is often not made. However, the following signs may be present:

1. Fetal tachycardia.
2. Maternal pyrexia and/or tachycardia.
3. Tenderness of the uterus.
4. Drainage of offensive liquor, if the membranes have ruptured.

If any of the above signs are present, a diagnosis of **clinical chorioamnionitis** must be made.

5-9 What factors may predispose to chorioamnionitis?

1. Rupture of the membranes.
2. Exposure of the membranes due to dilatation of the cervix.
3. Coitus during the second half of pregnancy.

However, in many cases, the factors that result in chorioamnionitis are not known.

5-10 Can chorioamnionitis cause complications during the puerperium?

Yes, it can cause serious problems.

1. Bacteria that have colonised the amniotic fluid, may infect the fetus and the infant may present with signs of infection (congenital pneumonia or septicaemia) at or soon after birth.
2. Chorioamnionitis may cause infection of the genital tract (puerperal sepsis) which, if not treated correctly, may result in septicaemia, the need for hysterectomy, and possibly in maternal death. These complications can usually be prevented by starting a course of broad-spectrum antibiotics (e.g. intravenous ampicillin plus metronidazole), as soon as the diagnosis of clinical chorioamnionitis is made.

5-11 What factors other than chorioamnionitis can lead to preterm labour and preterm rupture of the membranes?

The following maternal, fetal and placental factors may be associated with preterm labour and/or preterm rupture of the membranes:

1. Maternal factors:
 - Pyrexia, as the result of an acute infection other than chorioamnionitis, e.g. acute pyelonephritis or malaria.
 - Uterine abnormalities, such as congenital uterine malformations (e.g. septate or bicornuate uterus) and uterine myomas (fibroids).
 - Incompetence of the internal cervical os ('cervical incompetence').
2. Fetal factors:
 - A multiple pregnancy.
 - Polyhydramnios
 - Congenital malformations of the fetus.
 - Syphilis.
3. Placental factors:
 - Placenta praevia.
 - Abruptio placentae.

5-12 Which patients are at an increased risk of preterm labour or preterm rupture of the membranes?

Both preterm labour and preterm rupture of membranes are more common in patients who:

1. Have a past history of preterm labour.
2. Have no antenatal care.
3. Live in poor socio-economic circumstances.
4. Smoke, use alcohol or abuse habit-forming drugs.
5. Are underweight due to undernutrition.
6. Have coitus in the 2nd half of pregnancy, when they are at an increased risk of preterm labour or infections.
7. Have any of the maternal, fetal or placental factors listed above.

The most important risk factor for preterm labour is a previous history of preterm delivery.

5-13 What can be done to decrease the incidence of these complications?

1. Take measures to ensure that all pregnant women receive antenatal care.
2. Identify patients with a past history of preterm labour.
3. Give advice about the dangers of smoking, alcohol and the use of habit-forming drugs.
4. Advise against coitus during the late 2nd and in the 3rd trimester in pregnancies at high risk for preterm labour or preterm rupture of the membranes. If coitus occurs during pregnancy in these patients, the use of condoms must be recommended as this may reduce the risk of chorioamnionitis.
5. Insert a McDonald suture at 14–16 weeks, in patients with a proven incompetent internal cervical os.
6. Prevent teenage pregnancies.
7. Improve the socio-economic and nutritional status of poor communities.
8. Arrange that the workload of women, who have to do heavy manual labour, is decreased when they are pregnant and that an opportunity to rest during working hours is allowed.

5-14 How should you manage a patient at increased risk of preterm labour or preterm rupture of the membranes?

1. Patients at increased risk must have 2 weekly vaginal examinations from 24 weeks, in order to make an early diagnosis of preterm cervical effacement and/or dilatation.
2. In all women with cervical effacement or dilatation before 34 weeks, the following preventive measures can then be taken:
 - Bed rest. This can be at home, except when the home circumstances are poor, in which case the patient should be referred to the hospital for admission.
 - Sick leave must be arranged for working patients.
 - Coitus must be forbidden.
 - Advice must be given to report immediately, if contractions or rupture of the membranes occur.
 - Women with preterm labour or preterm rupture of the membranes must be seen as soon as possible, and the correct measures taken to prevent the delivery of a severely preterm infant.

All patients should be told to immediately report preterm labour or preterm rupture of the membranes.

5-15 What should you do if a patient threatens to deliver a preterm infant?

1. Infants born between 34 and 36 weeks can usually be cared for in a level 1 hospital.
2. However, women who threaten to deliver between 28 and 33 weeks, should be referred to a level 2 or 3 hospital with a neonatal intensive care unit.
3. If the birth of a preterm baby cannot be prevented, it must be remembered that the best incubator for transporting an infant is the mother's uterus. Even if the delivery is inevitable, an attempt to suppress labour should be made, so that the patient can be transferred before the infant is born.
4. The better the condition of the infant on arrival at the neonatal intensive care unit, the better is the prognosis.

Diagnosis of preterm labour and preterm rupture of the membranes

5-16 How should you distinguish between Braxton Hicks contractions and the contractions of preterm labour?

Braxton Hicks contractions:

1. Are irregular.
2. May cause discomfort but are not painful.
3. Do not increase in duration or frequency.
4. Do not cause cervical effacement or dilatation.

The duration of contractions cannot be used as Braxton Hicks contractions may last up to 60 seconds.

In contrast, the contractions of preterm or early labour:

1. Are regular, at least one per 10 minutes.
2. Are painful.
3. Increase in frequency and duration.
4. Cause effacement and dilatation of the cervix.

5-17 How should you confirm the diagnosis of preterm labour?

Both of the following will be present in a patient of less than 37 weeks gestation:

1. Regular uterine contractions, palpable on abdominal examination, of at least one per 10 minutes.
2. A history of rupture of the membranes, or cervical effacement and/or dilatation on vaginal examination.

5-18 How can you diagnose preterm rupture of the membranes?

1. A patient of less than 37 weeks gestation will give a history of sudden drainage of liquor followed by a continual leak of smaller amounts, without associated uterine contractions.
2. A sterile speculum examination will confirm the diagnosis of ruptured membranes.
3. **A digital vaginal examination must not be done** as it is of little value in diagnosing rupture of the membranes and may increase the risk of infection.

A digital vaginal examination must not be done in preterm rupture of the membranes.

5-19 What is the value of a sterile speculum examination when preterm rupture of the membranes is suspected?

1. The danger of ascending infection is not increased by this procedure.
2. Observing drainage of liquor from the cervical os confirms the diagnosis of ruptured membranes.
3. If no drainage of liquor is observed, drainage can sometimes be seen if the patient is asked to cough.
4. If no drainage of liquor is seen, a smear should be taken from the posterior vaginal fornix with a wooden spatula to determine the pH.
5. The possibility of cord prolapse can be excluded or confirmed.
6. It is also important to see whether the cervix is long and closed, or whether there is already clear evidence of cervical effacement and/or dilatation.
7. A patient with a profuse vaginal discharge or stress incontinence (leaking urine when coughing or laughing) may think that she is draining liquor. A speculum examination will help to confirm or rule out this possibility.

5-20 How should you test the vaginal pH?

1. The pH of the vagina is acid but the pH of liquor is alkaline.
2. Red litmus paper is pressed against the moist spatula. If the red litmus changes to blue, then liquor is present in the vagina, indicating that the membranes have ruptured. If blue litmus is used, it will remain blue with rupture of membranes or change to red if the membranes are intact.

5-21 How should you manage patients with preterm labour, preterm rupture of membranes and prelabour rupture of membranes?

1. If the gestational age is less than 36 weeks, these patients should be referred to a level I hospital for admission. If the gestational age is less than 34 weeks, she must be referred to a level 2 hospital.
2. If the gestational age is 36 weeks or more, patients can safely be delivered in a midwife obstetric unit (MOU) or district hospital. At a gestational age of 36 weeks babies will not develop the complications of preterm infants and could be discharged 6 hours following delivery with their mothers.

5-22 How will you decide that a patient is less than 36 weeks pregnant if the duration of the pregnancy is unknown?

This is done by measuring the symphysis-fundus height and by doing a complete abdominal examination. An estimated fetal weight of less than 2500 g, suggests a gestational age of less than 36 weeks. The symphysis-fundus height measurement will be less than 34 cm.

5-23 What should be done if preterm labour has been diagnosed and the patient is less than 34 weeks pregnant?

Contractions should be suppressed with nifedipine (Adalat). The patient must then be transferred as an urgent transferal to a level 2 hospital. If nifedipine is not available salbutamol (Ventolin) can be used. This measure will:

1. Improve the chance of successful suppression of preterm labour at the hospital.
2. Reduce the risk of a delivery before arrival at the hospital or clinic.

Infants born before 34 weeks are at increased risk of developing complications. Therefore, suppression of contractions to allow continuation of pregnancy is important in these cases. The earlier the suppression of contractions is started the better the chance of successful suppression will be.

5-24 How would you decide that a patient is less than 34 weeks pregnant if the duration of the pregnancy is unknown?

This is done by measuring the symphysis-fundus height and by doing a complete abdominal examination.

Labour must be suppressed if the estimated fetal weight is less than 2000 g as this suggests an estimated gestational age of less than 34 weeks. The symphysis-fundus height measurement will be less than 33 cm.

5-25 How should you give nifedipine for the suppression of preterm labour?

Three nifedipine (Adalat) 10 mg capsules (total 30 mg) should be taken by mouth. If there are still contractions with cervical dilatation and effacement 3 hours after the initial dose, a follow-up dose of 20 mg must be given.

5-26 What are the contraindications to the use of nifedipine in suppressing labour?

Nifedipine (Adalat) cannot be used for the suppression of preterm labour if patients have hypertension, e.g. suffering from any of the hypertensive disorders of pregnancy.

5-27 How should you use salbutamol for the suppression of preterm labour?

1. A half an ampoule (0.5 ml = 250 µg) of salbutamol (Ventolin) is diluted with 9.5 ml of sterile water in a 10 ml syringe and administered slowly intravenously (0.5 ml per minute) while the maternal heart rate is carefully monitored for a tachycardia.
2. The patient must be warned that salbutamol causes tachycardia (palpitations).

5-28 What are the contraindications to the use of salbutamol in suppressing labour?

1. Heart valve disease. The use of salbutamol (or another beta₂ stimulant), can endanger the patient's life, especially if she has a narrowed heart valve, e.g. mitral stenosis.
2. A shocked patient.
3. A patient with a tachycardia, e.g. as the result of an acute infection.

5-29 What advice should you give to a woman who has delivered a preterm infant?

1. She should be seen at a level 2 hospital before her next pregnancy to be assessed for possible causes, e.g. cervical incompetence.
2. She must book early in any future pregnancy.

Case study 1

A patient, 32 weeks pregnant, presents with regular painful uterine contractions. She is apyrexial and appears clinically well. On vaginal examination, the cervix is 4 cm dilated. The fetal heart rate is 138 beats per minute with no decelerations.

1. Is the patient in true or false labour? Give the reasons for your diagnosis.

She is in true labour because she is getting regular painful contractions and her cervix is 4cm dilated.

2. What signs exclude a diagnosis of clinical chorioamnionitis?

The patient is apyrexial, clinically well and has a normal fetal heart rate.

3. Why could chorioamnionitis still be the cause of her preterm labour?

Because chorioamnionitis is often asymptomatic (subclinical chorioamnionitis).

4. Would you allow labour to continue or would you suppress labour prior to referring the patient to the hospital?

Labour should be suppressed because the pregnancy is of less than 34 weeks duration.

5. How should labour be suppressed?

Labour must be suppressed using nifedipine (Adalat) or salbutamol (Ventolin).

Case study 2

A patient, who is 36 weeks pregnant, reports that she has been draining liquor since earlier that day. The patient appears well, with normal observations, no uterine contractions and the fetal heart rate is normal.

1. Would you diagnose rupture of the membranes on the history given by the patient?

No, other causes of fluid draining from the vagina may cause confusion, e.g. a vaginitis or stress incontinence.

2. How would you confirm rupture of the membranes?

A sterile speculum examination should be done. If there is no clear evidence of liquor draining, the vaginal pH must be determined with Litmus paper to identify liquor.

3. Why should you not perform a digital vaginal examination to assess whether the cervix is dilated or effaced?

A digital vaginal examination is contra-indicated in the presence of rupture of the membranes if the patient is not already in labour, because of the risk of introducing infection.

4. Is this patient at high risk of having or developing chorioamnionitis?

Yes. The preterm prelabour rupture of the membranes may have been caused by chorioamnionitis. In addition, all patients with ruptured membranes are at an increased risk of developing chorioamnionitis.

5. Should the patient be referred to a level I (district hospital/ MOU) or level II hospital? Give your reasons.

She is 36 weeks pregnant and there are no signs of chorio-amnionitis. She should be referred to a level I hospital or MOU.

Case study 3

An unbooked patient presents at a primary care clinic with a 5 day history of ruptured membranes. She is pyrexial with lower abdominal tenderness and is draining offensive liquor. She is uncertain of her dates but abdominal examination suggests that she is at term. Treatment has been started with oral ampicillin.

1. What signs of clinical chorioamnionitis does the patient have?

She is pyrexial, with lower abdominal tenderness and she has offensive liquor.

2. How should the patient be managed?

There is danger of spreading infection in both the mother and fetus if the infant is not delivered. The patient must be referred to the next level of care as an urgent case.

3. Is oral ampicillin the correct initial treatment while waiting for the transfer? Give your reasons.

Chorioamnionitis may result in a severe infection of the genital tract that may cause a maternal death. These complications can usually be prevented by

starting broad-spectrum antibiotics (ampicillin and metronidazole) as early as possible. The ampicillin must be given intravenously.

4. Why is the infant at increased risk for neonatal complications?

The chorioamnionitis has already spread to the liquor as this is offensive. Therefore, the fetus may also be infected and may present with congenital pneumonia or septicaemia at birth.

6

The puerperium and family planning

Before you begin this unit, please take the corresponding test to assess your knowledge of the subject matter. You should redo the test after you've worked through the unit, to evaluate what you have learned.

Objectives

When you have completed this unit you should be able to:

- Define the puerperium and list the physical changes which occur during the puerperium.
- Manage the normal puerperium.
- Assess a patient at the 6 week postnatal visit.
- Diagnose and manage the various causes of puerperal pyrexia.
- Recognise the puerperal psychiatric disorders.
- Diagnose and manage secondary postpartum haemorrhage.
- Teach the patient the concept of 'the mother as a monitor'.
- Explain the wider meaning of family planning and give contraceptive counselling.
- List the health benefits, efficiency, contraindications and side effects of the various contraceptive methods.
- Advise a postpartum patient on the most appropriate method of contraception.

The puerperium

6-1 What is the puerperium?

The puerperium is the period from the end of the third stage of labour until most of the patient's organs have returned to their pre-pregnant state.

6-2 How long does the puerperium last?

The puerperium starts when the placenta is completely delivered and lasts for 6 weeks. However, some organs may only return to their pre-pregnant state weeks or even months after the 6 weeks have elapsed (e.g. the ureters). Other organs never regain their pre-pregnant state (e.g. the perineum).

It is important for the midwife or doctor to assess whether the patient has returned, as closely as possible, to normal health and activity by the end of the puerperium.

The puerperium starts when the placenta is delivered and lasts for 6 weeks.

6-3 Why is the puerperium important?

1. The patient recovers from her labour, which often leaves her tired and even exhausted. There is, nevertheless, a feeling of great relief and happiness
2. The patient undergoes what is probably the most important psychological experience of her life, as she realises that she is responsible for another human being, her infant.
3. Breastfeeding should be established.
4. The patient should decide, with the guidance of a midwife or doctor, on an appropriate contraceptive method.

6-4 What physical changes occur in the puerperium?

Almost every organ undergoes change in the puerperium. These adjustments range from mild to marked. Only those changes which are important in the management of the normal puerperium following discharge from the hospital or clinic (midwife obstetric unit–MOU) will be described here.

1. Skin.

- The increased pigmentation of the face, abdominal wall and vulva lightens but the areolae may remain darker than they were before pregnancy.
- With the onset of diuresis (increased amount of urine passed) the general puffiness and any oedema disappear in a few days.
- Marked sweating may occur for some days.

2. Abdominal wall.

- The abdominal wall is flaccid (loose and wrinkled) and some separation (divarication) of the abdominal muscles occurs.
- Pregnancy marks (striae gravidarum), where present, do not disappear but do tend to become less red in time.

3. Gastrointestinal tract.

- Thirst is common.
- The appetite varies from anorexia to ravenous hunger.
- There may be flatulence (excess wind).
- Many patients are constipated as a result of decreased tone of the bowel during pregnancy and, decreased food intake during labour. They may also have passed stool during labour and delivery. Constipation is common in the presence of an episiotomy or painful haemorrhoids. Giving a patient an enema on admission in labour is of no advantage to her and contributes to constipation in the puerperium.

4. Urinary tract.

- Retention of urine is common and may result from decreased tone of the bladder in pregnancy and oedema of the urethra following delivery. Dysuria (discomfort or pain) and difficulty in passing urine may lead to complete urinary retention or retention with overflow incontinence. A full bladder will interfere with uterine contraction.
- A diuresis usually occurs on the second or third day of the puerperium. In oedematous patients it may start immediately after delivery.
- Stress incontinence (a leak of urine) is common when the patient laughs or coughs. It may first be noted during the puerperium or follow stress incontinence which was present during pregnancy. Often stress incontinence becomes worse initially but tends to improve with time and with pelvic floor exercises.

Pelvic floor exercises are also known as pinch or ‘knyp’ exercises. The muscles that are exercised are those used to suddenly stop a stream of urine

midway through micturition. These muscles should be tightened, as strongly as possible, 10 times in succession on at least 4 occasions a day.

5. Blood.

- The haemoglobin concentration becomes stable around the 4th day of the puerperium.
- The platelet count is raised and the platelets become more sticky from the 4th to 10th day after delivery. These and other changes in the clotting (coagulation) factors may cause thrombo-embolism in the puerperium.

6. Breasts. Marked changes occur during the puerperium with the production of milk

7. Genital tract. Very marked changes occur in the genital tract during the puerperium:

- **Vulva:** The vulva is swollen and congested after delivery, but these features rapidly disappear. Tears and/or an episiotomy usually heal easily.
- **Vagina:** Immediately after delivery the vagina is large, smooth walled, oedematous and congested. It rapidly shrinks in size and rugae return by the third week. The vaginal walls remain laxer than before and some degree of vaginal prolapse (cystocoele and/or rectocoele) is common after a vaginal delivery. Small vaginal tears, which are very common, usually heal in 7 to 10 days.
- **Cervix:** After the first vaginal delivery the circular external os of the nullipara becomes slit like. For the first few days after delivery the cervix remains partially open, admitting 1 or 2 fingers. By the 7th day postpartum the cervical os will have closed so that a finger can no longer be passed through it.
- **Uterus:** The most important change occurring in the uterus is involution. After delivery the uterus is about the size of a 20 week pregnancy. By the end of the first week it is about 12 weeks in size. At 14 days the fundus of the uterus should no longer be palpable above the symphysis pubis. After 6 weeks it has decreased to the size of a normal multiparous uterus, which is slightly larger than a nulliparous one. This remarkable decrease in size is the result of contraction and retraction of the uterine muscle. The normally involuting uterus should be firm and non-tender. The decidua of the uterus necroses (dies), due to ischaemia, and is shed as the lochia. The average duration of red lochia is 24 days. Thereafter, the lochia becomes straw

coloured. Normal lochia has a typical, non-offensive smell. Offensive lochia is always abnormal.

Management of the puerperium

The management of the puerperium may be divided into 3 stages:

1. The management of the first hour after delivery of the placenta (sometimes called the fourth stage of labour).
2. The management of the rest of the puerperium.
3. The 6 week postnatal visit.

6-5 When should a postpartum patient be allowed to go home?

This will depend on:

1. Whether the patient had a normal pregnancy and delivery.
2. The circumstances of the hospital or clinic where the patient was delivered.

6-6 When should a patient be allowed to go home following a normal pregnancy and delivery?

A patient who has had a normal pregnancy and delivery may be allowed to go home about 6 hours after the birth of her infant, provided:

1. The observations done on the mother and infant since delivery have been normal.
2. The mother and infant are normal on examination, and the infant is sucking well.
3. The patient is able to attend her nearest clinic on the day after delivery (day 1) and then again on days 3 and 5 after delivery for postnatal care, or be visited at home by a midwife on those days. Primigravidae should be seen again on day 7, especially to ensure that breastfeeding is well established.

A patient should only be discharged home after delivery if no abnormalities are found when the following examinations are performed:

- A general examination, paying particular attention to the:
 - Pulse rate.
 - Blood pressure.
 - Temperature.
 - Haemoglobin concentration.
- An abdominal examination, paying particular attention to the state of contraction and/or tenderness of the uterus.
- An inspection of the episiotomy site and the amount, colour and odour of the lochia.
- Patients who received no antenatal care and delivered without having any screening tests, must have a rapid syphilis test and a rapid test for Rhesus grouping. Counselling for HIV testing must also be done.

It is important to arrange for suitable contraception before the patient is discharged home.

The Essential Postnatal Obstetric Care (EPOC) card with the mother's and infant's discharge information could now be completed. If any of the shaded blocks are ticked, treatment is required or the mother needs to be referred to the next level of care. The checklist will again be used during the day-5 or -6 visit to check that all the important tasks have been completed (i.e. as a quality control tool).

6-7 When should a patient be discharged from hospital following a complicated pregnancy and delivery?

This will depend on the nature of the complication and the method of delivery. For example:

1. A patient with pre-eclampsia should be kept in hospital until her blood pressure has returned to normal or is well controlled with oral drugs.
2. A patient who has had a caesarean section will usually stay in hospital for 2 days or longer.
3. A patient who has had a postpartum haemorrhage must be kept in hospital for at least 24 hours to ensure that her uterus is well contracted and that there is no further bleeding.
4. HIV-positive patients are at increased risk for infections. Careful examination for any signs of infection is required and the patients should be kept in hospital or the delivery clinic for 24 hours.

6-8 How will the circumstances at a clinic or hospital influence the time of discharge?

1. Some clinics have no space to accommodate patients for longer than 6 hours after delivery. Therefore, patients who cannot be discharged safely at 6 hours will have to be transferred to a hospital.
2. Some hospitals manage patients who live in remote areas where follow-up is not possible. These patients will have to be kept in hospital longer before discharge.

6-9 What postnatal care should be given during the puerperium after the patient has left the hospital or clinic?

Ideally, visits for postnatal care must be scheduled for the day following discharge (day 1), day 3 and day 5 or 6. Limited health care facilities or long distances may require the visits to be limited to a single visit on day 5 or 6.

The following observations must be done on the **mother**:

1. Assess the patient's general condition.
2. Ask about problems with breathing and coughing.
3. Observe the pulse rate, blood pressure and temperature.
4. Determine the height of the uterine fundus and assess whether any uterine tenderness is present.
5. Assess whether the amount of vaginal bleeding is more than normal.
6. Assess the amount, colour and odour of the lochia.
7. Check whether the episiotomy is healing satisfactorily.
8. Ask if the patient passes urine normally and enquire about any urinary symptoms. Reassure the patient if she has not passed a stool by day 5.
9. Measure the haemoglobin concentration if the patient appears pale.
10. Assess the condition of the patient's breasts and nipples. Determine whether successful breastfeeding has been established.

The following observations must be done on the **infant**:

1. Assess whether the infant is feeding well and is satisfied after a feed.
2. Assess whether the infant appears well and is thriving.
3. Check whether the infant is jaundiced.
4. Examine the umbilical stump for signs of infection.

5. Examine the eyes for conjunctivitis.
6. Ask whether the infant has passed urine and stool.

The successful establishment of breastfeeding is one of the most important goals of patient care during the puerperium.

The EPOC card for the day 5 to 6 visit could now be completed. The checklist will again be used during the 6 weeks visit.

6-10 How can you help to establish successful breastfeeding?

By providing patient education and motivation. This should preferably start before pregnancy and continue throughout the antenatal period and after delivery. Encouragement and support are very important during the first weeks after delivery. The important role of successful breastfeeding in lowering infant mortality in poor communities must be remembered.

6-11 Which topics should you include under patient education in the puerperium?

Patient education regarding herself, her infant and her family should not start during the puerperium, but should be part of any woman's general education, starting at school. Topics which should be emphasised in patient education in the puerperium include:

1. Personal and infant care.
2. Offensive lochia, fever or severe abdominal pain must be reported immediately.
3. The 'puerperal blues'.
4. Family planning and safer sex.
5. Any special arrangements for the next pregnancy and delivery.
6. When to start coitus again. Usually coitus can be started 3 to 4 weeks postpartum when the episiotomy or tears have healed.

Patient education is an important and often neglected part of postnatal care.

6-12 When should a patient be seen again after postnatal care has been completed?

The postnatal visit is usually held 6 weeks after delivery. By this time almost all the organ changes which occurred during pregnancy should have disappeared.

The six week postnatal visit

6-13 Which patients need to attend a 6 week postnatal clinic?

Patients with specific problems that need to be followed up 6 weeks postpartum, e.g. patients who were discharged with hypertension need to come back to have their blood pressure measured. Patients who are healthy may be referred directly to the mother and child health clinics for follow up and need not attend a special 6 week postnatal clinic.

6-14 What are the objectives of the 6-week postnatal visit?

It is important to identify the reason why the patient was asked to attend the clinic and to determine whether:

1. The patient is healthy and has returned to her normal activities.
2. The infant is well and growing normally.
3. Breastfeeding has been satisfactorily established.
4. Contraception has been arranged to the patient's satisfaction.
5. The patient has been referred to a maternal and child health clinic for further care.
6. The patient has any questions about herself, her infant or her family.

6-15 How should the 6 week postnatal visit be conducted?

1. The patient is asked how she and her infant have been since the last postnatal care visit.
2. The patient is then examined. On examination pay particular attention to the blood pressure and breasts, and look for signs of anaemia. An abdominal examination is followed by a speculum examination to check whether the episiotomy, vulval or vaginal tears have healed.

3. A cytology smear of the cervix should be taken if the patient is 30 years or older and has not previously had a normal cervical smear. A cervical smear should also be taken on any woman who has previously had an abnormal smear.
4. The haemoglobin is measured and the urine tested for glucose and protein.
5. Attention must be given to any specific reason why the patient is being followed up, e.g. arrangements for the management of patients who remain hypertensive after delivery.
6. The patient is given health education. It should again be remembered to ask her whether she has any questions she would like to ask.

If the patient and her infant are both well, they are referred to their local maternal and child health clinic for further follow-up.

A patient and her infant should only be discharged if they are both well and have been referred to the local maternal and child health clinic, and the patient has received contraceptive counselling.

6-16 What additional management is needed for HIV-positive patients?

1. Patients that do not require antiretroviral treatment (CD4 count 250 cells/ml or more and stage 1 or 2 disease) must be encouraged to attend their nearest clinic for a clinical assessment and CD4 count every 6 months.
2. Patients on antiretroviral treatment must be encouraged to be compliant with regular clinic visits and adherence to medication.
3. Blood must be taken from the infant for a DNA PCR test and an appointment made so that the infant's result can be obtained and further management planned. The DNA PCR will determine whether the infant is HIV infected.
4. The essential postpartum care (EPOC) card (Figure 6-1) for the 6 weeks visit could now be completed.

Patient Details			Examination within 1 week (Infant)			Examination at 6 weeks (Infant)			Patient Details			Examination within 1 week (Mother)			Examination at 6 weeks (Mother)									
Date:	Exam by:	Delivered at:	Date:	Exam by:	Clinic:	Date:	Exam by:	Clinic:	Date:	Exam by:	Clinic:	Date:	Exam by:	Clinic:	Date:	Exam by:	Clinic:							
Infant's name:	Infant's name																							
Feeding?	EBF	FF	Other	*Ask the following			Feeding?	EBF	FF	Mixed														
Feeding well	YES	NO		Feeding?	EBF	FF	Mixed	Problems?	YES	NO		Problems with infant feeding?	YES	NO		Problems with infant feeding?	YES	NO						
Examination at discharge				Passed urine?	YES	NO		*Examine the following			Record weight and head circumference on Road to Health Chart				*Ask the mother the following									
Birth weight	Gestational age				Jaundice:	YES	NO		Jaundice:	YES	NO		Problems with infant feeding?	YES	NO		Problems with infant feeding?	YES	NO					
Jaundice:	Respiratory problems				Paled:	YES	NO		Pale:	YES	NO		Cough/Breathing difficulties?	YES	NO		Cough/Breathing difficulties?	YES	NO					
YES	NO	YES	NO		Passed stool?	YES	NO		Cyanosis:	YES	NO		Lochia foul smelling?	YES	NO		Problems with C/S wound?	YES	NO					
CVS problems	Abdominal problems				*Examine the following			Responds to sound:	YES	NO		Heavy vaginal bleeding?	YES	NO		Problems with episiotomy?	YES	NO						
YES	NO	YES	NO		Temperature (axillary)	Eyes (white spot)	YES	NO	Urinary incontinence?	YES	NO		Vaginal discharge?	YES	NO		Urinary incontinence?	YES	NO					
Gensis problems	CNS problems				Paled:	YES	NO		Tleusis:	YES	NO		Delivery route:	*Examine the following			Examine the following							
YES	NO	YES	NO		Umbilical cord smelly:	YES	NO		Fontanelle abnormal (anterior)	YES	NO		Birth weight:	Temp	Pulse	BP	UMAC:	Temp	Pulse	BP				
Umbilical problems	Hip dislocation:				Jaudiced:	YES	NO		Heart murmur:	YES	NO		Date of delivery:	Temp	*Examine the following			UMAC:	Temp	Pulse	BP			
YES	NO	YES	NO		Conjunctivitis:	YES	NO		Abdominal mass:	YES	NO		Gestational age:	Temp				Postpartum course:	Uterine tone:	YES	NO			
If ticks in shaded area comment on back as to problems and actions taken				Umbilical cord smelly:	YES	NO		* If ticks in shaded area comment on back → Refer, if cannot treat				If breast feeding, nipples cracked / breast inflamed:	YES	NO		If C/S, wound infected:	YES	NO		Uterine tenderness:	Hb g/l (value)			
NVP	YES	NO	N/A					* Vaccinate	PCR test:	YES	NO	N/A		NO	If ticks in shaded areas comment on back → Refer, if cannot treat									
AZT	YES	NO	N/A																					
AZT	7 days	28 days																						
Permission for PCR																								
YES	NO	N/A																						
Mother's name:																								
Signature(mother)																								
Signature(Witness)																								
* If ticks in shaded area please explain why on back																								

*UMAC=upper mid-arm circumference

Figure 6-1: The essential postpartum care card

Puerperal pyrexia

6-17 When is puerperal pyrexia present?

A patient has puerperal pyrexia if her oral temperature rises to 38 °C or higher during the puerperium.

6-18 Why is puerperal pyrexia important?

Because it may be caused by serious complications of the puerperium. Breastfeeding may be interfered with. The patient may become very ill or even die.

Puerperal pyrexia may be caused by a serious complication of the puerperium.

6-19 What are the causes of puerperal pyrexia?

1. Genital tract infection.
2. Urinary tract infection.
3. Mastitis or breast abscess.
4. Thrombophlebitis (superficial vein thrombosis).
5. Respiratory tract infection.
6. Other infections.

6-20 What is the cause of genital tract infection?

Genital tract infection (or puerperal sepsis) is caused by bacterial infection of the raw placental site or lacerations of the cervix, vagina or perineum.

6-21 How should you diagnose genital tract infection?

1. **History.** If one or more of the following is present:
 - Preterm or prelabour rupture of the membranes, a long labour, operative delivery or incomplete delivery of the placenta or membranes may have occurred.
 - The patient will feel generally unwell.
 - Lower abdominal pain.
2. **Examination.**
 - Pyrexia, usually developing within the first 24 hours after delivery. Rigors may occur.
 - Marked tachycardia.
 - Lower abdominal tenderness.
 - Offensive lochia.
 - The episiotomy wound or perineal or vaginal tears may be infected.

6-22 How should you manage genital tract infection?

These patients require admission to a hospital urgently and must be referred. While waiting to be transferred treatment could be initiated:

- Measures to bring down the temperature, e.g. tepid sponging.
 - Analgesia, e.g. paracetamol (Panado) 1 g (2 adult tablets) orally 6 hourly.
 - Intravenous fluids.
 - Broad-spectrum antibiotics, e.g. ampicillin and metronidazole (Flagyl).
- Antibiotic treatment must be started before transfer.

6-23 How must a patient with offensive lochia be managed?

1. If the patient has a pyrexia she must be admitted to hospital.
2. If the patient has a normal temperature and normal involution of her uterus, she can be managed as an out patient with oral ampicillin and metronidazole (Flagyl).

Offensive lochia is an important sign of genital tract infection.

6-24 How should you diagnose a urinary tract infection?

1. History.

- The patient may have been catheterised during labour or in the puerperium.
- Lower abdominal pain and/or pain in the lower back over one or both the kidneys (the loins).
- Dysuria and frequency. However, these are not reliable symptoms of urinary tract infection.

2. Examination.

- Pyrexia, often with rigors (shivering).
- Tachycardia.
- Suprapubic and flank tenderness and/or tenderness, especially to light percussion, over the kidneys (punch tenderness in the renal angles).

3. Side room and special investigations.

- Microscopy of a midstream or catheter specimen of urine usually shows large numbers of pus cells and bacteria.
- Culture and sensitivity tests of the urine must be done if the facilities are available.

The presence of pyrexia and punch tenderness in the renal angles indicates an upper renal tract infection and a diagnosis of acute pyelonephritis must be made.

6-25 How should you manage a patient with a urinary tract infection?

1. Prevention.

- Avoid catheterisation whenever possible. If catheterisation is essential, it must be done with strict aseptic precautions.
- 2. **Treatment.** These patients require admission to a hospital urgently and must be referred. While waiting to be transferred treatment could be initiated:
 - Measures to bring down the temperature, e.g. tepid sponging.
 - Analgesia, e.g. paracetamol (Panado) 1 g (2 adult tablets) orally 6 hourly.
 - Intravenous fluids.

Antibiotics should not be given to a patient with puerperal pyrexia until she has been fully investigated.

6-26 What is superficial vein thrombophlebitis?

This is a non-infective inflammation and thrombosis of the superficial veins of the leg or forearm where an infusion was given. Thrombophlebitis commonly occurs during the puerperium, especially in varicose veins.

6-27 How should you diagnose superficial leg vein thrombophlebitis?

1. History.

- Painful swelling of the leg or arm.
- Presence of varicose veins.

2. Examination.

- Pyrexia.
- Tachycardia.
- Presence of a localised area of the leg or arm which is swollen, red and tender.

6-28 How should you manage a patient with superficial vein thrombophlebitis?

1. Give analgesia, e.g. aspirin 300 mg (1 adult tablet) 6 hourly.
2. Support the leg with an elastic bandage.
3. Encourage the patient to walk around.

6-29 How should you diagnose a lower respiratory tract infection?

A lower respiratory tract infection, such as acute bronchitis or pneumonia, is diagnosed as follows:

1. **History.**
 - The patient may have had general anaesthesia with endotracheal intubation, e.g. for a caesarean section.
 - Cough, which may be productive.
 - Pain in the chest.
 - A recent upper respiratory tract infection.
2. **Examination.**
 - Pyrexia.
 - Tachypnoea (breathing rapidly).
 - Tachycardia.
3. **Special investigations.**
 - A chest X-ray is useful in diagnosing pneumonia.

6-30 How should you manage a patient with a lower respiratory tract infection?

1. **Treatment.** These patients require admission to a hospital urgently and must be referred unless the infection is very mild. While waiting to be transferred treatment could be initiated:
 - Oxygen if required.
 - Ampicillin orally or intravenously depending on the severity of the infection.
 - Analgesia, e.g. paracetamol (Panado) 1 g.
2. **Special investigations.**
 - Send a sample of sputum for microscopy, culture and sensitivity testing if possible.

6-31 Which other infections may cause puerperal pyrexia?

Tonsillitis, influenza and any other acute infection, e.g. acute appendicitis or meningitis.

6-32 What should you do if a patient presents with puerperal pyrexia?

1. Ask the patient what she thinks is wrong with her.
2. Specifically ask for symptoms which point to:
 - An infection of the throat or ears.
 - Mastitis or breast abscess.
 - A chest infection.
 - A urinary tract infection.
 - An infected abdominal wound if the patient had a caesarean section or a puerperal sterilisation.
 - Genital tract infection.
 - Superficial leg vein thrombophlebitis.
3. Examine the patient systematically, including the:
 - Throat and ears.
 - Breasts.
 - Chest.
 - Abdominal wound, if present.
 - Urinary tract.
 - Genital tract.
 - Legs, especially the calves.
4. Perform the necessary special investigations, but always send off a:
 - Endocervical swab.
 - Midstream or catheter specimen of urine.
5. Start the appropriate treatment.

If a patient presents with puerperal pyrexia the cause of the pyrexia must be found and appropriately treated.

Puerperal psychiatric disorders

6-33 Which are the puerperal psychiatric disorders?

1. The ‘puerperal blues’.
2. Temporary postnatal depression.
3. Puerperal psychosis.

6-34 Why is it important to recognise the various puerperal psychiatric disorders?

1. The ‘puerperal blues’ are very common in the first week after delivery, especially on day 3. The patient feels miserable and cries easily. Although the patient may be very distressed, all that is required is an explanation, reassurance, and a caring, sympathetic attitude and emotional support. The condition improves within a few days.
2. Postnatal depression is much more common than is generally realised. The onset is later than ‘puerperal blues’ and it may last for months or even years. The patients may need to be referred to a psychiatrist. Patients with postnatal depression usually present with a depressed mood that cannot be relieved, a lack of interest in their surroundings, a poor or excessive appetite, sleeping difficulties, feelings of inadequacy, guilt and helplessness, and sometimes suicidal thoughts.
3. Puerperal psychosis is an uncommon but very important condition. The onset is usually acute and an observant attendant will notice the sudden and marked change in the patient’s behaviour. She may rapidly pose a threat to her infant, the staff and herself. Such a patient must be referred urgently to a psychiatrist and will usually need admission to a psychiatric unit. Patients with puerperal psychosis are unable to care for themselves or their infants. They are often disoriented and paranoid and may have hallucinations. They may also be severely depressed or manic.

Secondary postpartum haemorrhage

6-35 What is secondary postpartum haemorrhage?

This is any amount of vaginal bleeding, other than the normal amount of lochia, occurring after the first 24 hours postpartum until the end of the puerperium. It commonly occurs between the fifth and fifteenth days after delivery.

6-36 Why is secondary postpartum haemorrhage important?

1. A secondary postpartum haemorrhage may be so severe that it causes shock.
2. Unless the cause of the secondary postpartum haemorrhage is treated, the vaginal bleeding will continue.

6-37 What are the causes of secondary postpartum haemorrhage?

1. Genital tract infection with or without retention of a piece of placenta or part of the membranes. This is the commonest cause.
2. Separation of an infected slough in a cervical or vaginal laceration.
3. Breakdown (dehiscence) of a caesarean section wound of the uterus.

However, the cause is unknown in up to half of these patients.

6-38 What clinical features should alert you to the possibility of the patient developing secondary postpartum haemorrhage?

1. A history of incomplete delivery of the placenta and/or membranes.
2. Unexplained puerperal pyrexia.
3. Delayed involution of the uterus.
4. Offensive and/or persistently red lochia.

6-39 How should you manage a patient with secondary postpartum haemorrhage?

1. **Treatment.** These patients require admission to a hospital and must be referred unless the haemorrhage is very mild. While waiting to be transferred treatment could be initiated:
 - Review of the clinical notes with regard to completeness of the placenta and membranes.
 - Obtain an endocervical swab for bacteriology.
 - Give ampicillin and metronidazole (Flagyl) orally.
 - Give Syntometrine 1 ml intramuscularly or 20 units oxytocin in an intravenous infusion if excessive haemorrhage is present.

6-40 What may you find on physical examination to suggest that retained pieces of placenta or membranes are the cause of a secondary postpartum haemorrhage?

1. The uterus will be involuting slower than usual.
2. Even though the patient may be more than 7 days postpartum, the cervical os will have remained open and a finger can be passed through the cervix.

Self-monitoring

6-41 What is meant by the concept of ‘the mother as a monitor’?

This is a concept where the patient is made aware of the many ways in which she can monitor her own, as well as her fetus’ or infant’s wellbeing, during pregnancy, in labour and in the puerperium. This has two major advantages:

1. The patient becomes much more involved in her own perinatal care.
2. Possible complications will be reported by the patient at the earliest opportunity.

6-42 How can the patient act as a monitor in the puerperium?

The patient must be encouraged to report the following complications as soon as she becomes aware of them:

- 1. Maternal complications.**
 - Symptoms of puerperal pyrexia.
 - Breakdown of an episiotomy.
 - Breastfeeding problems.
 - Excessive or offensive lochia.
 - Recurrence of vaginal bleeding, i.e. secondary postpartum haemorrhage.
 - Prolonged postnatal depression.

- 2. Complications in the infant.**

- Poor feeding or other feeding problems.
- Lethargy.
- Jaundice.
- Conjunctivitis.
- Infection of the umbilical cord stump.

Each patient must be taught to monitor her own wellbeing, as well as that of her fetus or infant.

Family planning in the puerperium

6-43 What is family planning?

Family planning is far more than simply birth control, and aims at improving the quality of life for everybody. Family planning is an important part of primary health care and includes:

1. Promoting a caring and responsible attitude to sexual behaviour.
2. Ensuring that every child is wanted.
3. Encouraging the planning and spacing of the number of children according to a family's home conditions and financial income.
4. Providing the highest quality of maternal and child care.
5. Educating the community with regard to the disastrous effects of unchecked population growth on the environment.

It is essential to obtain prior community acceptance of, and promote community participation in, any family planning programme if the programme is to succeed in that community.

6-44 Who requires family planning education?

Because family planning aims at improving the quality of life for everybody, every person, female or male, requires family planning education. Such education should ideally start during childhood and be given in the home by the parents. It is then continued at school and throughout the rest of the individual's life.

6-45 Who needs contraceptive counselling?

Every person who is sexually active, or who probably will soon become sexually active, needs contraceptive counselling (i.e. information and advice about birth control). While the best time to advise a woman on contraception is before the first coitus, the antenatal and postdelivery periods provide an excellent opportunity to provide contraceptive counselling. Some patients will ask you for contraceptive advice. However, you will often have to first motivate a patient to accept contraception before you can advise her about an appropriate method of contraception.

6-46 How should you motivate a patient to accept contraception after delivery?

A good way to motivate a patient to accept contraception is to discuss with her, or preferably with both her and her partner, the health and socio-economic effects further children could have on her and the rest of the family. Explain the immediate benefits of a smaller, well-spaced family.

It is generally hopeless to try and promote contraception by itself. To gain individual and community support, family planning must be seen as part of total primary health care. A high perinatal or infant mortality rate in a community is likely to result in a rejection of contraception.

6-47 How should you give contraceptive advice after delivery?

There are 5 important steps which should be followed:

Step 1: Discussion of the patient's future reproductive career

Ideally a woman should consider and plan her family before her first pregnancy, just as she would have considered her professional career. Unfortunately in practice this hardly ever happens and many women only

discuss their reproductive careers for the first time when they are already pregnant or after the birth of the infant.

When planning her family the woman (or preferably the couple) should decide on:

1. The number of children wanted.
2. The time intervals between pregnancies as this will influence the method of contraception used.
3. The contraceptive method of choice when the family is complete.

Very often the patient will be unable or unwilling to make these decisions immediately after delivery. However, it is essential to discuss contraception with the patient so that she can plan her family. This should be done together with her husband and, where appropriate, other members of her family or friends.

Step 2: The patient's choice of a contraceptive method

The patient should always be asked which contraceptive method she would prefer as this will obviously be the method with which she is most likely to continue.

Step 3: Consideration of contraindications to the patient's preferred method

You must decide whether the patient's choice of a contraceptive method is suitable, taking into consideration:

1. The effectiveness of each contraceptive method.
2. The contraindications to each contraceptive method.
3. The side effects of each contraceptive method.
4. The general health benefits of each contraceptive method.

If the contraceptive efficiency of the preferred method is appropriate, if there are no contraindications to it, and if the patient is prepared to accept the possible side effects, then the method chosen by the patient should be used. Otherwise proceed to step 4.

Step 4: Selection of the most appropriate alternative method of contraception

The selection of the most suitable alternative method of contraception after delivery will depend on a number of factors including the patient's wishes,

her age, the risk of side effects and whether or not a very effective method of contraception is required.

Step 5: Counselling the patient once the contraceptive method has been chosen

Virtually every contraceptive method has its own side effects. It is a most important part of contraceptive counselling to explain the possible side effects to the patient. Expert family planning advice must be sought if the local clinic is unable to deal satisfactorily with the patient's problem. If family planning method problems are not satisfactorily solved, the patient will probably stop using any form of contraception.

After delivery the reproductive career of each patient must be discussed with her in order to decide on the most appropriate method of family planning to be used.

6-48 What contraceptive methods can be offered after delivery?

1. Sterilisation. Either tubal ligation (tubal occlusion) or vasectomy.
2. Injectables (i.e. an intramuscular injection of depot progestogen).
3. Oral contraceptives. Either the combined pill (containing both oestrogen and progestogen) or a progestogen-only pill (the 'minipill').
4. An intra-uterine contraceptive device (IUCD).
5. The condom.

Breastfeeding, spermicides alone, coitus interruptus and the 'safe period' are all very unreliable. All women should know about postcoital contraception.

Breastfeeding cannot be relied upon to provide postpartum contraception.

6-49 How effective are the various contraceptive methods?

Contraceptive methods for use after delivery may be divided into very effective and less effective ones. Sterilisation, injectables, oral contraceptives

and intra-uterine contraceptive devices are very effective. Condoms are less effective contraceptives.

6-50 How effective is postcoital contraception?

1. Norlevo, E Gen-C or Ovral are effective within 5 days of unprotected sexual intercourse, but are more reliable the earlier they are used.
2. A copper intra-uterine contraceptive device can be inserted within 6 days of unprotected intercourse.
3. Postcoital methods should only be used in an emergency and not as a regular method of contraception.
4. If Norlevo is used, one tablet should be taken as soon as possible after intercourse, followed by another one tablet after exactly 12 hours.
5. If Ovral or E-Gen-C is used, two tablets are taken as soon as possible after intercourse, followed by another two tablets exactly 12 hours later.

The tablets for postcoital contraception often cause nausea and vomiting which reduce their effectiveness. These side effects are less with Norlevo which contains no oestrogen. Therefore Norlevo is a more reliable method and should be used if available. Norlevo as a single dose method is available and on code in the public sector in South Africa.

6-51 What are the contraindications to the various contraceptive methods?

The following are the common or important conditions where the various contraceptive methods should **not** be used:

1. Sterilisation:
 - Marital disharmony.
 - Psychological problems.
 - Forced or hasty decision.
 - Gynaecological problem requiring hysterectomy.
2. Injectables:
 - Depression.
 - Pregnancy planned within 1 year.

3. Combined pills:
 - A history of venous thrombo-embolism.
 - Age 35 years or more with risk factors for cardiovascular disease (i.e. smoking).
 - Anyone of 50 or more years.
 - Oestrogen-dependent malignancies such as breast or uterine cancer.
 - HIV positive women on ART that includes a protease inhibitor (PI).
Lopinavir/ritonavir is a PI commonly used as a second line ARV regimen.
4. Progestogen-only pill (minipill):
 - None.
5. Copper-containing intra-uterine contraceptive device:
 - A history of excessive menstruation.
 - Anaemia.
 - Multiple sex partners when the risk of genital infection is high.
 - Pelvic inflammatory disease.
 - Immuno-compromised patients (i.e. AIDS with stage 4 disease).

A menstrual abnormality is a contra-indication to any of the hormonal contraceptive methods (injectables, combined pill or progestogen-only pill) until the cause of the menstrual irregularity has been diagnosed. Thereafter, hormonal contraception may often be used to correct the menstrual irregularity. However, during the puerperium a previous history of menstrual irregularity before the pregnancy is not a contraindication to hormonal contraception.

6-52 What are the major side effects of the various contraceptive methods?

Most contraceptive methods have side effects. Some side effects are unacceptable to a patient and will cause her to discontinue the particular method. However, in many instances side effects are mild or disappear with time. It is, therefore, very important to counsel a patient carefully about the side effects of the various contraceptive methods, and to determine whether she would find any of them unacceptable. At the same time the patient may be reassured that some other side effects will most likely become less or disappear after a few months' use.

The major side effects of the various contraceptive methods used after delivery are:

1. Sterilisation:
 - Tubal ligation and vasectomy have no medical side effects and, therefore, should be highly recommended during counselling of patients who have completed their families. Menstrual irregularities are NOT a problem. However, about 5% of women later regret sterilisation.
2. Injectables:
 - Menstrual abnormalities, e.g. amenorrhoea, irregular menstruation or spotting.
 - Weight gain.
 - Headaches.
 - Delayed return to fertility within a year of stopping the method. There is no evidence that fertility is reduced thereafter.
3. Combined pill:
 - Reduction of lactation.
 - Menstrual abnormalities, e.g. spotting between periods.
 - Nausea and vomiting.
 - Depression.
 - Fluid retention and breast tenderness.
 - Chloasma (a brown mark on the face).
 - Headaches and migraine.
4. Progestogen-only pill:
 - Menstrual abnormalities, e.g. irregular menstruation.
 - Headaches.
 - Weight gain.
5. Intra-uterine contraceptive device:
 - Expulsion in 5–15 cases per 100 women who use the device for one year.
 - Pain at insertion.
 - Dysmenorrhoea.
 - Menorrhagia (excessive and/or prolonged bleeding).
 - Increase in pelvic inflammatory disease.
 - Perforation of the uterus is uncommon.

- Ectopic pregnancy is not prevented.
 - Progesterone-containing devices (Mirena) have fewer side effects and reduce menstrual blood loss. These devices are expensive and not generally available in the public health sector facilities.
6. Condom:
- Decreased sensation for both partners.
 - Not socially acceptable to everyone.

If a couple have completed their family the contraceptive method of choice is tubal ligation or vasectomy.

Additional contraceptive precautions must be taken when the contraceptive effectiveness of an oral contraceptive may be impaired, e.g. diarrhoea or when taking antibiotics. There is no medical reason for stopping a hormonal method periodically to ‘give the body a rest’.

6-53 What are the important health benefits of contraceptives?

The main objective of all contraceptive methods is to prevent pregnancy. In developing countries pregnancy is a major cause of mortality and morbidity in women. Therefore, the prevention of pregnancy is a very important general health benefit of all contraceptives.

Various methods of contraception have a number of additional health benefits. Although these benefits are often important, they are not generally appreciated by many patients and health-care workers:

1. Injectables:
 - Decrease in dysmenorrhoea.
 - Less premenstrual tension.
 - Less iron-deficiency anaemia due to decreased menstrual flow.
 - No effect on lactation.
2. Combined pill:
 - Decrease in dysmenorrhoea.
 - Decrease in menorrhagia (heavy and/or prolonged menstruation).
 - Less iron-deficiency anaemia.

- Less premenstrual tension.
 - Fewer ovarian cysts.
 - Less benign breast disease.
 - Less endometrial and ovarian carcinoma.
3. Progestogen-only pill:
 - No effect on lactation.
 4. Condom:
 - Less risk of HIV infection and other sexually transmitted diseases.
 - Less pelvic inflammatory disease.
 - Less cervical intra-epithelial neoplasia.

The condom is the only contraceptive method that provides protection against HIV infection.

6-54 What is the most appropriate method of contraception for a patient after delivery?

The most suitable methods for the following groups of patients are:

1. Lactating patients:
 - An injectable, but not if a further pregnancy is planned within the next year.
 - A progestogen-only pill (minipill) for 3 months, then the combined pill.
 - An intra-uterine contraceptive device. Non-lactating patients can start the combined pill following one month's use of a progesterone-only pill.
2. Teenagers and patients with multiple sexual partners:
 - An injectable, as this is a reliable method even with unreliable patients who might forget to use another method.
 - Additional protection against HIV infection by using a condom is essential. It is important to stress that the patient should only have intercourse with a partner who is willing to use a condom.
3. HIV-positive patients:
 - Condoms must be used in addition to the appropriate contraceptive method (dual contraception).

4. Patients whose families are complete:
 - Tubal ligation or vasectomy is the logical choice.
 - An injectable, e.g. Depo-Provera or Petogen (12 weekly) or Nur-Isterate (8 weekly).
 - A combined pill until 35 years of age if there are risk factors for cardiovascular disease, or until 50 years if these risk factors are absent.
5. Patients of 35 years or over without risk factors for cardiovascular disease:
 - Tubal ligation or vasectomy is the logical method.
 - A combined pill until 50 years.
 - An injectable until 50 years of age.
 - A progestogen-only pill until 50 years of age.
 - An intra-uterine contraceptive device until 1 year after the periods have stopped, i.e. when there is no further risk of pregnancy.
6. Patients of 35 years or over with risk factors for cardiovascular disease:
 - As above but NO combination pill.

The puerperium is the most convenient time for the patient to have a bilateral tubal ligation performed.

Every effort should be made to provide facilities for tubal ligation during the puerperium for all patients who request sterilisation after delivery.

Remember that sperms may be present in the ejaculate for up to 3 months following vasectomy. Therefore, an additional contraceptive method must be used during this time.

6-55 What are the risk factors for cardiovascular disease in women taking the combined pill?

The risk of cardiovascular disease increases markedly in women of 35 or more years of age who have 1 or more of the following risk factors:

1. Smoking.
2. Hypertension.
3. Diabetes.
4. Hypercholesterolaemia.
5. A personal history of cardiovascular disease.

Smoking is a risk factor for cardiovascular disease.

6-56 When should an intra-uterine contraceptive device be inserted after delivery?

It should not be inserted before 6 weeks as the uterine cavity would not yet have returned to its normal size. At 6 weeks or more after delivery there is the lowest risk of:

1. Pregnancy.
2. Expulsion.

Postpartum patients choosing this method must be discharged on an injectable contraceptive or progestogen-only pill until an intra-uterine contraceptive device has been inserted.

Case study 1

A patient returns to a clinic for a visit 3 days after a normal first pregnancy and delivery. She complains of leaking urine when coughing or laughing, and she is also worried that she has not passed a stool since the delivery. She starts to cry and says that she should not have fallen pregnant. Her infant takes the breast well and sleeps well after each feed. On examination the patient appears well, her observations are normal, the uterus is the size of a 16 week pregnant uterus, and the lochia is red and not offensive.

1. Is her puerperium progressing normally?

Yes. The patient appears healthy with normal observations, and the involution of her uterus is satisfactory.

2. What should be done about the patient's complaints?

Stress incontinence is common during the puerperium. Therefore, the patient must be reassured that it will improve over time. However, pelvic floor exercises must be explained to her as they will hasten improvement of her incontinence. She need not be worried about not having passed a stool as this is normal during the first few days of the puerperium.

3. Why is the patient regretting her pregnancy and crying for no apparent reason?

She probably has the ‘puerperal blues’ which are common in the puerperium. Listen sympathetically to the patient’s complaints and reassure her that she is managing well as a mother. Also explain that her feelings are normal and are experienced by most mothers.

4. What educational topics must be discussed with the patient during this visit?

1. Family size and when she plans to have her next infant.
2. Which contraceptive method she should use and how to use it correctly.
3. The care and feeding of her infant, stressing the importance of breastfeeding.
4. Symptoms of a genital tract infection, i.e. offensive lochia, fever and lower abdominal pain.
5. The time that coitus can be resumed.

Also ask about, and discuss, any other uncertainties which the patient may have.

Case study 2

Following a prolonged first stage of labour due to an occipito-posterior position, a patient has a spontaneous vertex delivery in hospital. The placenta and membranes are complete. There is no excessive postpartum blood loss and the patient is discharged home after 6 hours. Within 24 hours of delivery the patient is brought back to the clinic nearest to her home. She has a temperature of 39 °C, a pulse rate of 110 beats per minute and complains of a headache and lower abdominal pain. The uterus is tender to palpation.

1. What does the patient present with?

Puerperal pyrexia.

2. What is the most likely cause of the puerperal pyrexia?

Genital tract infection, i.e. puerperal sepsis. This diagnosis is suggested by the general signs of infection and the uterine tenderness. The patient had a prolonged first stage of labour, which is usually accompanied by a greater than usual number of vaginal examinations and, therefore, predisposes to genital tract infection.

3. Was the early postnatal management of this patient correct?

No. The patient should not have been discharged home so early as she had a prolonged first stage of labour which places her at a higher risk of infection. She should have been observed for at least 24 hours.

4. How should you manage this patient further in the clinic?

She must be made comfortable. Paracetamol (Panado) 1 g orally may be given for the headache. If necessary she should be given a tepid sponging. An intravenous infusion should be started and she must then be referred to hospital. If at all possible the infant must accompany the patient to hospital. The need to start antibiotic treatment, e.g. intravenous ampicillin and oral metronidazole (Flagyl), before transfer must be discussed with the doctor.

Case study 3

A patient is seen at a clinic on day 5 days following a normal pregnancy, labour and delivery. She complains of rigors and lower abdominal pain. She has a temperature of 38.5 °C, tenderness over both kidneys (loins) and tenderness to percussion over both renal angles. A diagnosis of puerperal pyrexia is made and the patient is given oral ampicillin. She is asked to come back to the clinic on day 7.

1. Are you satisfied with the diagnosis of puerperal pyrexia?

No. Puerperal pyrexia is a clinical sign and not a diagnosis. The cause of the pyrexia must be found by taking a history, doing a physical examination and, if indicated, completing special investigations.

2. What is the most likely cause of the patient's pyrexia?

An upper urinary tract infection as suggested by the pyrexia, rigors, lower abdominal pain and tenderness over the kidneys.

3. Do you agree with the management given to the patient?

No. A urinary tract infection that causes puerperal pyrexia is an indication for admitting the patient to hospital. An intravenous broad-spectrum antibiotic (ampicillin or cefuroxime) must be given as this will lead to a rapid recovery and prevent serious complications.

4. Why is a puerperal patient at risk of a urinary tract infection and how may this be prevented?

Catheterisation is often required and this increases the risk of a urinary tract infection. Catheterisation must only be carried out when necessary and must always be done as an aseptic procedure.

Case study 4

A 36 year old woman that delivered her fourth child in a midwife obstetric unit the previous day is seen at a clinic for postnatal care. All her children are alive and well. She is a smoker but is otherwise healthy. She has never used contraception.

1. Should you counsel this patient about contraception?

Yes. Every sexually active person needs contraceptive counselling. This patient in particular needs counselling as she is at an increased risk of maternal and perinatal complications, should she fall pregnant again, because of her age and parity.

2. Which contraceptive methods would be appropriate for this patient?

Tubal ligation or vasectomy would be the most appropriate method of contraception if she does not want further children. Should she not want

sterilisation, either an injectable contraceptive or an intra-uterine contraceptive device would be the next best choice.

3. If the patient accepts tubal ligation, when should this be done?

The most convenient time for the patient and her family is shortly after delivery (postpartum sterilisation). Every effort should be made to provide facilities for postpartum sterilisation for all patients who request it.

4. If the couple decides not to have a tubal ligation or vasectomy, how will you determine whether an injectable or an intra-uterine contraceptive device would be the best choice?

Assessing the risk for pelvic inflammatory disease will determine which of the 2 methods to use. If the patient has a stable relationship, an intra-uterine contraceptive device may be more appropriate. However, if she or her husband (or boyfriend) has other sexual partners, an injectable contraceptive would be indicated.

5. What other advice must be given to a patient at risk of sexually transmitted infections?

The patient must insist that her partner wears a condom during sexual intercourse. This will reduce the risk of HIV infection.

Case study 5

1. Does this young teenager require contraceptive advice after delivery?

Yes, she will certainly need contraceptive counselling. She needs to learn sexual responsibility and must be told to attend a family planning clinic. She also needs to know about postcoital contraception.

2. Which contraceptive method would be most the appropriate for this patient?

An injectable contraceptive would probably be the best method for her as she needs reliable contraception for a long time.

3. Why would she need a long-term contraceptive?

Because she should only have her next child when she is much older and has a stable relationship.

4. If the patient prefers to use an oral contraceptive, would you regard this as an appropriate method of contraception for her?

No. A method which she is more likely to use correctly and reliably would be more appropriate. Oral contraceptives are only reliable if taken every day.

5. The patient and her mother are worried that the long-term effect of injectable contraception could be harmful to a girl of 15 years. What would be your advice?

Injectable contraception is extremely safe and, therefore, is an appropriate method for long-term use. This method will not reduce her future fertility.

Case study 6

A healthy 32 year old woman visits a clinic for postnatal care. She had a normal delivery 3 days ago. In discussing contraception with her, she mentions that she is planning to fall pregnant again within a year after she stops breastfeeding. She is a school teacher and would like to continue her career after having 2 children.

1. The patient says that she has used an injectable contraceptive for 5 years before this pregnancy and would like to continue with this method. What would your advice be?

Injectable contraception would not be appropriate as she plans her next pregnancy within a year, and there may be a delayed return to fertility.

2. If the patient insists on using an injectable contraceptive, which drug would you advise her to use?

Any one of the injectables can be used (Depo Provera, Petogen or Nur-Isterate) could be used as there is no proven advantage of any one above the others.

3. Following further counselling, the patient decides on oral contraception and is given a combined pill. Do you agree with this management?

No. As she plans to breastfeed, she should be given a progestogen-only pill. Combined oral contraceptive pills may reduce milk production while breastfeeding is being established. Progestogen-only pills have no effect on breastfeeding and must be used at least for the first 3 months following delivery of her baby.

Case study 7

A married primipara from a rural area has just been delivered in hospital. She has a stable relationship with her husband and they decide to have their next infant in 5 years time. The patient would like to have an intra-uterine contraceptive device inserted.

1. Is this an appropriate method for this patient?

Yes, as the risk of developing pelvic inflammatory disease is low.

2. When should the device be inserted?

Six weeks or more after delivery as there is an increased risk of expulsion if the device is inserted earlier.

3. Could the patient, in the meantime, rely on breastfeeding as a contraceptive method?

No. The risk of pregnancy is too high. She should use reliable contraception, such as injectable contraception or the progestogen-only pill, until the device is inserted.

7

Medical problems during pregnancy and the puerperium

Before you begin this unit, please take the corresponding test to assess your knowledge of the subject matter. You should redo the test after you've worked through the unit, to evaluate what you have learned.

Objectives

When you have completed this unit you should be able to:

- Diagnose and manage cystitis.
- Reduce the incidence of acute pyelonephritis in pregnancy.
- Diagnose acute pyelonephritis in pregnancy.
- Diagnose and manage anaemia during pregnancy.
- Identify patients who may possibly have heart valve disease.
- Manage a patient who develops glycosuria during pregnancy.
- Manage women needing antiretroviral treatment.

Urinary tract infection during pregnancy

7-1 Which urinary tract infections are important during pregnancy?

1. Cystitis.
2. Asymptomatic bacteriuria.
3. Acute pyelonephritis.

7-2 Why are urinary tract infections common during pregnancy and the puerperium?

1. Placental hormones cause dilatation of the ureters.
2. Pregnancy suppresses the function of the immune system.
3. Catheterisation during the first and second stage of labour is common.

A urinary tract infection is the most common infection during pregnancy.

7-3 How is cystitis diagnosed?

1. Severe urinary symptoms suddenly appear:
 - Dysuria (pain on passing urine).
 - Frequency (having to pass urine often).
 - Nocturia (having to get up at night to pass urine).
2. The patient appears generally well with normal observations. The only clinical sign is tenderness over the bladder.
3. Examination of the urine under a microscope shows many pus cells and bacteria.
A midstream urine sample for culture must be collected, if possible, to confirm the clinical diagnosis. Treatment must commence immediately without waiting for the results of the culture.

7-4 How should you manage a patient with cystitis?

Give 4 adult tablets of co-trimoxazole (e.g. Bactrim, Co-Trim, Durobac, Mezenol or Purbac) as a single dose. This is also the drug of choice for patients who are allergic to penicillin.

Amoxycillin (Amoxil) 3 g as a single dose orally could also be used but organisms causing cystitis are often resistant to this antibiotic. The treatment will be more successful if 2 amoxycillin capsules (250 mg) are replaced with 2 Augmentum tablets that contain an added 125 mg clavulanic acid each.

A midstream sample should be sent for culture and sensitivity at the next antenatal visit to determine whether the management was successful.

Co-trimoxazole can be safely used during pregnancy, including the first trimester.

7-5 What is asymptomatic bacteriuria?

It is significant colonisation of the urinary tract with bacteria, without any symptoms of a urinary tract infection.

7-6 Why is asymptomatic bacteriuria during pregnancy important?

1. Between 6 and 10% of pregnant women have asymptomatic bacteriuria.
2. One third of these patients with asymptomatic bacteriuria will develop acute pyelonephritis during pregnancy.
3. If patients with asymptomatic bacteriuria are diagnosed and correctly managed, their risk of developing acute pyelonephritis will be reduced by 70%.
4. The risk for preterm labour is significantly increased with asymptomatic bacteriuria.

The diagnosis and treatment of asymptomatic bacteriuria will greatly reduce the incidence of acute pyelonephritis and preterm labour during pregnancy.

7-7 How and when should patients be screened for asymptomatic bacteriuria?

If possible, bacterial culture of a midstream urine sample should be done at the first antenatal visit to screen patients for asymptomatic bacteriuria.

If possible, a screening test for asymptomatic bacteriuria should be done at the first antenatal visit.

7-8 Can reagent strips be reliably used to diagnose asymptomatic bacteriuria?

No. Tests for nitrites (which detect the presence of bacteria) and leukocytes, separately or together, cannot be used to accurately screen for asymptomatic bacteriuria.

7-9 What is the management of a patient with asymptomatic bacteriuria?

The same as the management of a patient with cystitis, i.e. 4 adult tablets of co-trimoxazole (e.g. Bactrim, Septran) as a single dose or amoxycillin (Amoxil) 3 g as a single dose orally. Patients who are allergic to penicillin should be given co-trimoxazole.

A midstream specimen of urine should again be sent for microscopy, culture and sensitivity at the next antenatal visit to determine whether the management was successful.

7-10 What symptoms suggest acute pyelonephritis?

1. Most patients have severe general symptoms:
 - Headache.
 - Pyrexia and rigors (shivering).
 - Lower backache, especially pain over the kidneys (renal angles).
2. Only 40% of patients have urinary complaints.

7-11 What physical signs are usually found in a patient with acute pyelonephritis?

1. The patient is acutely ill.
2. The patient usually has high pyrexia and a tachycardia. However, the temperature may be normal during rigors.
3. On abdominal examination, the patient is tender over one or both kidneys. The patient is also tender on light percussion over one or both renal angles (posteriorly over the kidneys).

7-12 What is the management of a patient with acute pyelonephritis?

1. The patient must be admitted to hospital.
2. A midstream urine sample for culture and sensitivity must be collected if possible to confirm the clinical diagnosis, identify the bacteria and determine the antibiotic of choice.
3. An intravenous infusion of Balsol or Ringer's lactate should be started and 1 litre given rapidly over 2 hours. Thereafter, 1 litre of Maintelyte should be given every 8 hours.
4. An intravenous broad-spectrum antibiotic, e.g. cefuroxime (Zinecef) should be given prior to transfer.
5. Pethidine 100 mg is given intramuscularly for severe pain while paracetamol (Panado) 2 adult tablets can be used for moderate pain.
6. Paracetamol (Panado) 2 adult tablets, together with tepid sponges, are used to bring down a high temperature.

Patients with acute pyelonephritis during pregnancy must be admitted to hospital for treatment with a broad-spectrum antibiotic.

7-13 Why is acute pyelonephritis a serious infection in pregnancy?

Because serious complications can result:

1. Preterm labour.
2. Septic shock.
3. Perinephric abscess (an abscess around the kidney).
4. Anaemia.

7-14 What should be done at the first antenatal visit after the patient has been treated for acute pyelonephritis?

1. A midstream urine sample for culture and sensitivity must be collected to determine whether the treatment has been successful.
2. The haemoglobin concentration must be measured as there is a risk of anaemia developing.

Anaemia in pregnancy

7-15 What is the definition of anaemia in pregnancy?

A haemoglobin concentration of less than 11 g/dl.

7-16 What are the dangers of anaemia?

1. Heart failure which can result from severe anaemia.
2. Shock which may be caused by a relatively small vaginal blood loss (antenpartum haemorrhage, delivery or postpartum haemorrhage) in an anaemic patient.

7-17 What are the common causes of anaemia in pregnancy?

1. Iron deficiency as the result of a diet poor in iron.
2. Blood loss during pregnancy (also during labour or the puerperium).
3. Acute infections (e.g. pyelonephritis), chronic infections (e.g. tuberculosis and HIV), and infestations (e.g. malaria, bilharzia or hook worm) in regions where these occur.
4. Folic acid deficiency is less common.

The commonest cause of anaemia in pregnancy is iron deficiency.

A full blood count, which is sent to the laboratory, will usually identify the probable cause of the anaemia.

The size and colour of the red cells indicate the probable cause of the anaemia:

1. Microcytic, hypochromic cells suggest iron deficiency.
2. Normocytic, normochromic cells suggest bleeding or infection.
3. Macrocytic, normochromic cells suggest folate deficiency.

7-18 What is the management of patients with iron deficiency in pregnancy or the puerperium?

1. The management of iron-deficiency anaemia in pregnancy will depend on the haemoglobin concentration and the duration of pregnancy:
 - If the haemoglobin concentration is less than 8 g/dl, the gestational age is less than 36 weeks, and the patient is asymptomatic, she can be treated with 2 tablets of ferrous sulphate 3 times a day and be followed at the antenatal clinic.
 - If the haemoglobin concentration is less than 8 g/dl and the gestational age is 36 weeks or more, the patient must be admitted to hospital for a blood transfusion.
 - All patients with a haemoglobin concentration of less than 8 g/dl who are short of breath or have a tachycardia of more than 100 beats per minute (signs of heart failure) must be admitted to hospital for a blood transfusion. In addition she must be treated with 2 tablets of ferrous sulphate 3 times a day that must be continued at least one month after the baby has been delivered.
 - If the haemoglobin concentration is between 8 g/dl and 10 g/dl, the patient can be treated with 2 tablets of ferrous sulphate 3 times a day. If the haemoglobin concentration does not increase after 2 weeks or the patient is 36 weeks pregnant or more, and a full blood count has not yet been done, then a full blood count must be done to decide whether the cause of the anaemia is iron deficiency.
 - If the haemoglobin concentration is 10 g/dl or more, but less than 11 g/dl, the patient can be treated with one tablet of ferrous sulphate 3 times a day.
2. The management of a patient with iron-deficiency anaemia during the puerperium will depend on whether the patient is bleeding or not:
 - If the patient is not bleeding, if she has no signs of heart failure, and her haemoglobin concentration is 6 g/dl or more, she can be treated with oral iron tablets. One tablet of ferrous sulphate 3 times daily for a month is sufficient.
 - If the patient is not bleeding and she has signs of heart failure, or if her haemoglobin concentration is less than 6 g/dl, she must be admitted to hospital for a blood transfusion to be followed by oral iron for a month.
 - If the patient is bleeding, she should be managed for a postpartum haemorrhage.

7-19 Should all patients receive iron supplements in pregnancy?

1. Well-nourished patients who have a healthy diet and a haemoglobin concentration of 11 g/dl or more, do not need iron supplements.
2. Patients who are poorly nourished, have a poor diet or have a haemoglobin concentration of less than 11 g/dl need iron supplements.
3. Patients from communities where iron deficiency is common, or where socio-economic circumstances are poor, should receive iron supplements.

Iron tablets are dangerous to small children as even one tablet can cause serious iron poisoning. Therefore, patients must always keep their iron tablets in a safe place where children cannot reach them.

7-20 How are iron supplements given in pregnancy?

As 200 mg ferrous sulphate tablets:

1. Patients with a haemoglobin concentration of 11 g/dl or higher must take one tablet daily.
2. Patients who are anaemic must be managed as described in 7-18.

7-21 What side effects can be caused by ferrous sulphate tablets?

Nausea and even vomiting due to irritation of the lining of the stomach.

7-22 How should you manage a patient who complains of side effects due to ferrous sulphate tablets?

1. The tablets should be taken with meals. Although less iron will be absorbed, the side effects will be less.
2. If the patient continues to complain of side effects, she should be given 300 mg ferrous gluconate tablets instead. They cause fewer side effects than ferrous sulphate tablets.

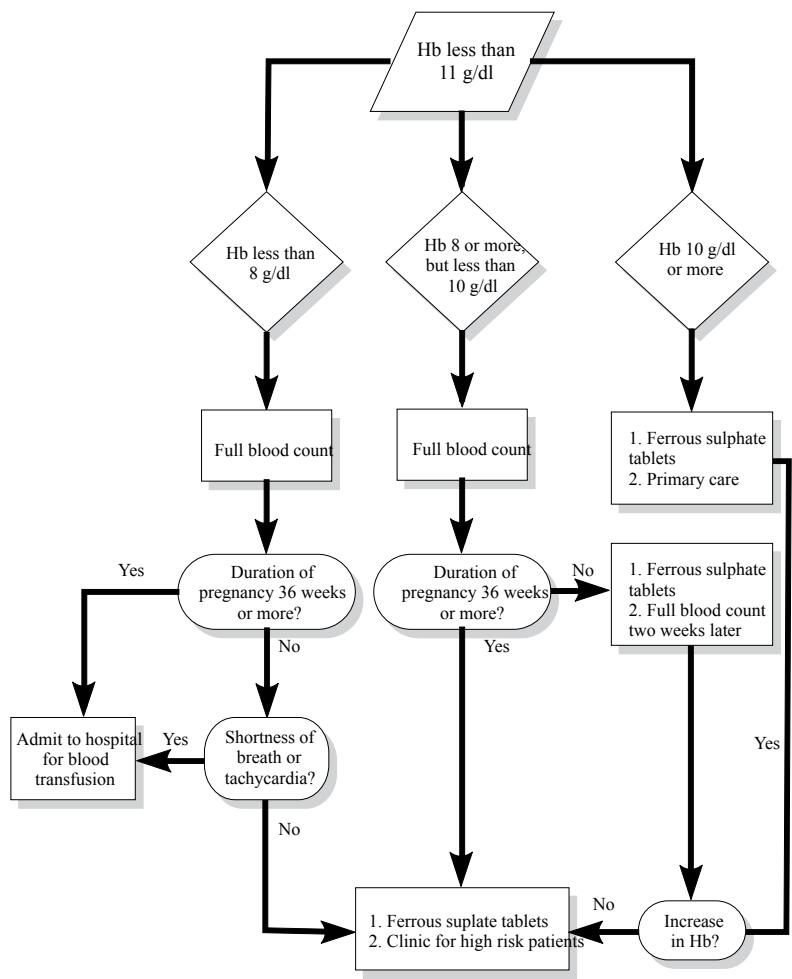


Figure 7-1: Flow diagram: The management of a patient with iron-deficiency anaemia in pregnancy

Heart valve disease in pregnancy and the puerperium

Heart valve disease consists of damage to, or abnormality of, one or more of the valves of the heart. Usually the mitral valve is damaged. The cause of heart valve disease in a developing country is almost always rheumatic fever during childhood.

7-23 Why is it important during pregnancy to identify patients with heart valve disease?

1. A correct diagnosis of the type of heart valve disease and good management of the problem reduces the risk to the patient during her pregnancy.
2. Undiagnosed heart valve disease and inadequate treatment may result in serious complications (e.g. heart failure causing pulmonary oedema) which may threaten the patient's life.
3. A clear family planning plan must be made during the pregnancy. The patient may have a reduced lifespan and cannot risk having a large family.

Correct diagnosis and good management reduce the risk to the patient of heart valve disease in pregnancy.

7-24 Which symptoms in a patient's history suggest that she may have heart valve disease?

1. Shortness of breath on exercise or even with limited effort.
2. Coughing up blood (haemoptysis).
3. Often the patient has previously been told by a doctor that she has a 'leaking heart'.
4. Some patients with heart valve disease give a history of previous rheumatic fever. However, most patients are not aware that they have suffered from previous rheumatic fever.

The cause of heart valve disease in a developing country is almost always previous rheumatic fever. However, these patients usually do not know that they have had one or more attacks of rheumatic fever during childhood.

During the examination of the cardiovascular system, a cardiac murmur will be heard if the patient has heart valve disease.

7-25 How should a patient with heart valve disease in pregnancy be managed?

1. The patient must be referred to the high-risk antenatal clinic.
2. At the high-risk antenatal clinic the type of lesion and correct management will be determined.
3. The follow-up visits will also be at the high-risk antenatal clinic. However, the patient may be referred to the primary care antenatal clinic for some 'inbetween' visits. Take care to follow the instructions from the high-risk clinic carefully.
4. Patients who are not hospitalised should stop work earlier and rest more than usual.
5. The patient must be told to report immediately if she experiences any symptoms of heart failure, e.g. worsening shortness of breath or tiredness.
6. The patient must at least be delivered at a secondary level hospital where specialist care is available.

7-26 What form of family planning should be offered to patients with heart valve disease who have completed their families?

A postpartum sterilisation should be done. Because of the risk of heart failure, the procedure must be postponed until the third day after delivery. Patients who are willing and are prepared to return for the procedure, can have a laparoscopic sterilisation done 6 weeks after delivery. Meanwhile, an injectable contraceptive must be given.

Diabetes mellitus in pregnancy

7-27 Why is it important to diagnose diabetes if it develops in pregnancy?

Diabetes mellitus is a disorder which is caused by the secretion of inadequate amounts of insulin from the pancreas to keep the blood glucose concentration normal. As a result, the blood glucose concentration becomes abnormally high. Diabetes may often present for the first time in pregnancy, and may then recover spontaneously after delivery. The early diagnosis and good management of diabetes in pregnancy will greatly reduce the incidence of complications.

7-28 What complications may be caused by diabetes in pregnancy if it is not diagnosed early and is not well managed?

1. Throughout the pregnancy infections are common, especially:
 - Candida vaginitis.
 - Urinary tract infection.
2. During the first trimester congenital abnormalities may occur in the developing fetus due to the raised blood glucose concentration.
3. During the third trimester pre-eclampsia and polyhydramnios are common.
4. The fetus may be large, if the patient's diabetes has been poorly controlled during the pregnancy, resulting in problems during labour and delivery mainly:
 - Cephalopelvic disproportion.
 - Impacted shoulders.
5. During the third stage of labour there is an increased risk of postpartum haemorrhage.
6. The newborn infant is at increased risk of many complications, especially hypoglycaemia and hyaline membrane disease.

7-29 How can complications which commonly occur in diabetics during pregnancy and labour be avoided?

These complications can largely be avoided by:

1. Early diagnosis.
2. Good control of the blood glucose concentration.

Early diagnosis and good control of the blood glucose concentration will prevent most of the pregnancy and labour complications caused by diabetes.

7-30 How can diabetes be diagnosed early if it should develop for the first time during pregnancy?

1. At every antenatal visit all patients should routinely have their urine tested for glucose.
2. A random blood glucose concentration must be measured if the patient has 1+ glycosuria or more at any antenatal visit.

Patients with glycosuria during pregnancy must always be investigated further for diabetes.

7-31 Is a reagent strip accurate enough to measure a random blood glucose concentration?

Yes, if an electronic instrument (Glucometer or Reflolux) is used to measure the blood glucose concentration. A reagent strip alone may not be accurate enough. If an instrument is not available, a sample of blood must be sent to the nearest laboratory for a blood glucose measurement.

7-32 Is it possible that a patient with an initially normal blood glucose concentration may develop an abnormal concentration later in pregnancy?

Yes. This may be possible due to an increase in the amount of placental hormones as pregnancy progresses. Placental hormones tend to increase the

blood glucose concentration, explaining why some patients only become diabetic during their pregnancies.

7-33 How should random blood glucose measurements be interpreted and how do the results determine further management?

A random blood glucose measurement is done on a blood sample taken from the patient at the clinic without any previous preparation, i.e. the patient does not have to fast. However, patients who have had nothing to eat during the past 4 hours should be encouraged to eat something before the test.

1. A random blood glucose concentration of less than 8 mmol/l is normal. These patients can receive routine primary care. However, if glycosuria is again present, a random blood glucose measurement must be repeated.
2. A random blood glucose concentration of 8 mmol/l or more, but less than 11 mmol/l, may be abnormal and is an indication to measure the fasting blood glucose concentration. The further management of the patient will depend on the result of the fasting blood glucose concentration.
3. A random blood glucose concentration of 11 mmol/l or more is abnormal and indicates that the patient has diabetes. These patients must be admitted to hospital to have their blood glucose controlled. Thereafter, they must remain on treatment and be followed as high-risk patients.

7-34 How should fasting blood glucose measurements be interpreted and how do the results determine further management?

The patient must have nothing to eat or drink (except water) from midnight. At 08:00 the next day a sample of blood is taken and the fasting blood glucose concentration is measured:

1. A fasting blood glucose concentration of less than 6 mmol/l is normal. These patients can receive routine primary care. If their random blood glucose concentration is again abnormal, the fasting blood glucose concentration should be measured again.
2. Patients with fasting blood glucose concentrations of 6 mmol/l or more but less than 8 mmol/l should be placed on a 7600 kilojoule (1800 kilocalorie) diabetic diet. A glucose profile should be determined after 2 weeks and be

repeated every 4 weeks until delivery. Usually the glucose profile becomes normal on this low kilojoule diet.

3. Patients with a fasting blood glucose concentration of 8 mmol/l or more have diabetes. They must be admitted to hospital so that their blood glucose concentration can be controlled.

A 7600 kJ diabetic diet consists of a normal diet with reduced refined carbohydrates (e.g. sugar, cool drinks, fruit juices) and added high fibre foods (e.g. beans and wholewheat bread).

A patient with a normal blood glucose concentration early in pregnancy may develop diabetes later during that pregnancy.

7-35 How is a glucose profile obtained?

The patient must have nothing to eat or drink (except water) from midnight. At 08:00 the next day a sample of blood is taken and the fasting blood glucose concentration is measured. Immediately afterwards she has breakfast (which she can bring with her to the clinic). After 2 hours the blood glucose concentration is measured again.

7-36 How should the glucose profile be interpreted and how do the results determine further management?

1. A fasting blood glucose result of less than 6 mmol/l and a 2 hour result of less than 8 mmol/l are normal. These patients can be followed up as intermediate risk patients.
2. A fasting blood glucose result of 6 mmol/l or more and/or a 2 hour result of 8 mmol/l or more are abnormal. These patients must be admitted to hospital so that they can have their blood glucose concentration controlled.

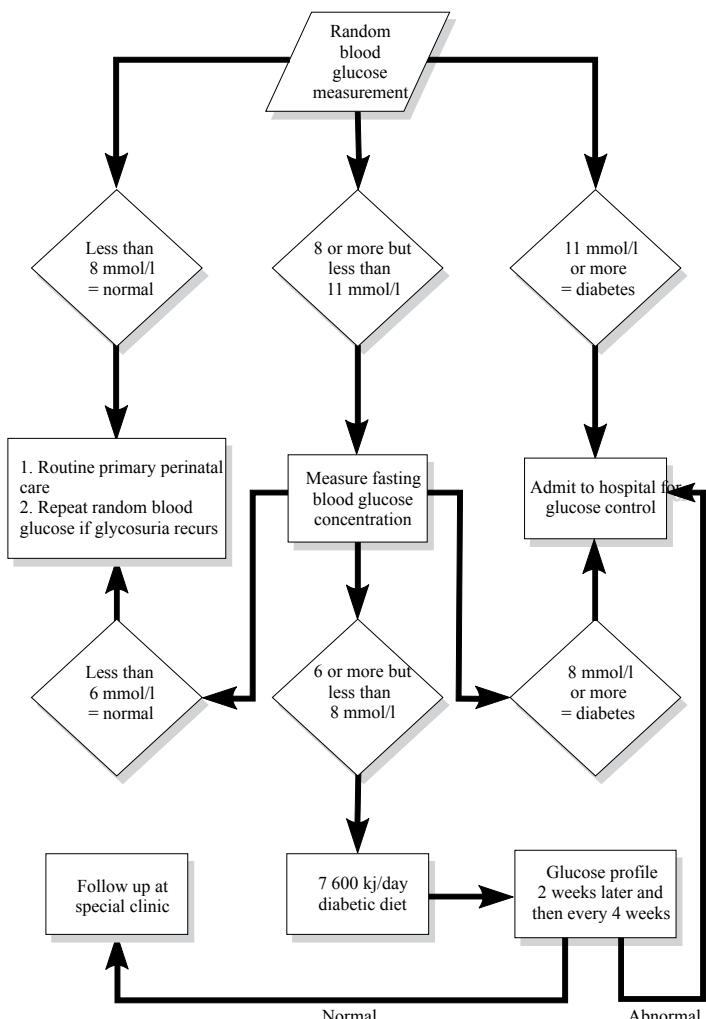


Figure 7-2: Flow diagram: The management of a patient with glycosuria who has a random blood glucose concentration measured in pregnancy.

HIV infection and AIDS in pregnancy

7-37 What is AIDS?

AIDS is a severe clinical illness caused by the human immunodeficiency virus (HIV). Therefore, severe HIV disease is called AIDS. However, women with HIV infection can remain clinically well for many years before developing signs of the disease. Patients with AIDS have a damaged immune system. They become infected and often die of other ‘opportunistic infections’ such as tuberculosis.

7-38 Is AIDS an important cause of maternal death?

As the HIV epidemic spreads, the number of pregnant women dying of AIDS has increased dramatically. In some countries, such as South Africa, AIDS is now the commonest cause of maternal death.

The Third Report on Confidential Enquiries into Maternal Deaths in South Africa 2002–2004 showed that AIDS was the commonest cause of maternal death. Many additional AIDS deaths may have been missed, as HIV testing is often not done.

AIDS is the commonest cause of maternal death in South Africa.

7-39 Does pregnancy increase the risk of progression from asymptomatic to symptomatic HIV infection and AIDS?

Pregnancy appears to have little or no effect on the progression from asymptomatic to symptomatic HIV infection. However, in women who already have symptomatic HIV infection, pregnancy may lead to a more rapid progression to AIDS.

The progression of HIV infection during pregnancy can be monitored by:

1. Laboratory tests.
2. Clinical signs.

7-40 How is the severity of HIV infection classified?

1. By assessing the clinical stage of the disease:
 - Stage 1: Clinically well.
 - Stage 2 Mild clinical problems.
 - Stage 3: Moderate clinical problems.
 - Stage 4: Severe clinical problems (ie. AIDS).
2. By measuring the CD4 count in the blood: A falling CD4 count is an important marker of progression in HIV. It is an indicator of the degree of damage to the immune system. A normal CD4 count is 700 to 1100 cells/ μ l. A CD4 count below 350 cells/ μ l indicates severe damage to the immune system.

The CD4 count is an important marker of HIV progression during pregnancy.

7-41 Can an HIV-positive woman be cared for in a primary care clinic?

Most women who are HIV positive are clinically well with a normal pregnancy. Others may only have minor problems (stage 1 or 2). These women can usually be cared for in a primary care clinic throughout their pregnancy, labour and puerperium provided their pregnancy is normal. Women with a pregnancy complication should be referred to hospital, as would be done with HIV-negative patients. Women with severe HIV-related problems (stage 3 or 4) will need to be referred to a special HIV clinic or hospital.

Many HIV-positive women can be managed at a primary care clinic.

7-42 How are pregnant women with HIV infection managed at a primary care clinic?

The management of pregnant women with HIV infection is very similar to that of non-pregnant adults. The most important step is to identify those pregnant women who are HIV positive.

The principles of management of pregnant women with HIV infection at a primary care clinic are:

1. Make the diagnosis of HIV infection by offering HIV screening to all pregnant women at the start of their antenatal care.
2. Take a history and do a clinical assessment to assess the clinical stage of the disease.
3. Assess the CD4 count in all HIV-positive women as soon as their HIV status is known.
4. Screen for clinical signs of HIV infection to assess whether the woman has advanced to a more severe stage of the disease at each antenatal visit.
5. Good diet. Nutritional support may be needed.
6. Emotional support and counselling.
7. Prevention of mother-to-child transmission (PMTCT) of HIV.
8. Start antiretroviral treatment when indicated.
9. Early referral if there are pregnancy or HIV complications.

7-43 Which clinical signs suggest stage 1 and 2 HIV infection?

1. Persistent generalised lymphadenopathy is the only clinical sign of stage 1 HIV infection.
2. Signs of stage 2 HIV infection include:
 - Mild weight loss (less than 10% of body weight).
 - Repeated or chronic mouth or genital ulcers.
 - Extensive skin rashes.
 - Repeated upper respiratory tract infections such as otitis media or sinusitis.
 - Herpes zoster (shingles).

Most of these women can be managed at a primary care clinic while some may have to be referred to an HIV clinic for help with treatment. These clinical problems are usually treated symptomatically with simple drugs which are not expensive.

7-44 What are the important features suggesting stage 3 or 4 HIV infection?

1. Features of stage 3 HIV infection include:
 - Unexplained weight loss (more than 10% of body weight).
 - Oral candidiasis (thrush).

- Cough, fever and night sweats suggesting pulmonary tuberculosis.
 - Cough, fever and shortness of breath suggesting bacterial pneumonia.
 - Chronic diarrhoea or unexplained fever for more than one month.
 - Pulmonary tuberculosis (TB)
2. Features of stage 4 HIV infection include:
- Severe weight loss.
 - Severe or repeated bacterial infections, especially pneumonia.
 - Severe HIV associated (opportunistic) infections such as oesophageal candidiasis (which presents with difficulty swallowing) and Pneumocystis pneumonia (which presents with cough, fever and shortness of breath).
 - Malignancies such as Kaposi's sarcoma.
 - Extrapulmonary TB.

7-45 What is antiretroviral treatment?

Antiretroviral treatment (i.e. ART or HAART) is the use of three or more antiretroviral drugs in combination to treat patients with severe HIV infection. The aim of antiretroviral treatment is to lower the viral load and allow the immune system to recover.

7-46 What are the indications for antiretroviral treatment in pregnancy?

The indications for antiretroviral treatment at an HIV clinic are either of the following:

1. Clinical signs of stage 3 or 4 HIV infection.
2. A CD4 count below 350 cells/ μ l.

7-47 What patient preparation is needed for antiretroviral treatment?

Preparing a patient to start antiretroviral treatment is very important. This requires education, counselling and social assessment before antiretroviral treatment can be started. These patients need to learn about their illness and the importance of excellent adherence (taking their antiretroviral drugs at the correct time every day) and regular clinic attendance. They also need to know the side effects of antiretroviral drugs and how to recognise them. Careful general examination and blood sent for a laboratory hemoglobin

concentration and liver function test (ALT) are also needed before starting antiretroviral treatment. It usually takes 2 weeks to prepare a patient.

7-48 What drugs are used for starting antiretroviral treatment during pregnancy?

Usually antiretroviral treatment is provided to pregnant women in South Africa with three drugs:

- D4T 40 mg 12 hourly (or 30 mg 12 hourly in women weighing less than 60 kg or AZT 300 mg 12 hourly).
- 3TC (lamivudine) 150 mg every 12 hours.
- Nevirapine 200 mg daily for two weeks followed by 200 mg every 12 hours or efavirenz (EFV) 600 mg in the evening if the gestational age is more than 12 weeks.

This is the current national first line standard drug combination used during pregnancy. It may change in future.

7-49 What are the side effects of antiretroviral treatment?

Pregnant women on antiretroviral treatment may have side effects to the drugs. These are usually mild and occur during the first 6 weeks of treatment. However, side effects may occur at any time that patients are on antiretroviral treatment. It is important that the staff at primary care clinics are aware of these side effects and that they ask for symptoms and look for signs at each clinic visit. Side effects with antiretroviral treatment are more common than with antiretroviral prophylaxis during pregnancy.

Common early side effects during the first few weeks of starting antiretroviral treatment include:

1. Lethargy, tiredness and headaches.
2. Nausea, vomiting and diarrhoea.
3. Muscle pains and weakness.

These mild side effects usually disappear on their own. They can be treated symptomatically. It is important that antiretroviral treatment is continued even if there are mild side effects.

More severe side effects, which can be fatal, include:

1. AZT may suppress the bone marrow causing anaemia. There may also be a reduction in the white cell and platelet counts.
2. Severe skin rashes with nevirapine. All patients with severe skin rashes must urgently be referred to the HIV clinic.
3. Hepatitis can be caused by all antiretroviral drugs but especially nevirapine.
4. Lactic acidosis is a late but serious side effect, especially with d4T. It presents with weight loss, tiredness, nausea, vomiting, abdominal pain and shortness of breath in patients who have been well on antiretroviral treatment for a few months.

Staff at primary care clinics must be aware and look out for these very important side effects.

7-50 How should pregnant women on antiretroviral treatment be managed?

The national protocol should be followed. It is very important that staff at the antenatal clinic are trained to manage women with HIV infection. They should work together with the local HIV clinic or infectious diseases clinic of the local hospital.

Case study 1

A patient presents at 30 weeks gestation and complains of backache, feeling feverish, dysuria and frequency. On examination she has a tachycardia and a temperature of 38.5 °C. A diagnosis of cystitis is made and the patient is given oral ampicillin to take at home.

1. Do you agree with the diagnosis?

No. The symptoms and signs suggest that the patient has acute pyelonephritis.

2. Is the management of this patient adequate to treat acute pyelonephritis?

No. The patient should be admitted to hospital and be given a broad-spectrum antibiotic intravenously.

3. Why is it necessary to treat acute pyelonephritis in pregnancy so aggressively?

Because severe complications may occur which can be dangerous both to the patient and her fetus.

4. What should be done at the first antenatal visit after the patient is discharged from hospital?

A midstream urine sample should be collected for culture to make sure that the infection has been adequately treated. Her haemoglobin concentration must also be measured as patients often become anaemic after acute pyelonephritis.

Case study 2

A patient is seen at her first antenatal visit. She is already 36 weeks pregnant and has a haemoglobin concentration of 7.5 g/dl. As she is not short of breath and has no history of antepartum bleeding, she is treated with 2 tablets of ferrous sulphate to be taken 3 times a day. She is asked to return to the clinic in one week.

1. Do you agree with the management?

No. The patient is already 36 weeks pregnant and, therefore, is at great risk of going into labour before her haemoglobin concentration has had time to respond to the oral iron treatment. Therefore, the patient must be admitted to hospital and be given a blood transfusion.

2. Are any further investigations needed?

Yes. The cause of the anaemia must always be looked for. Blood for a full blood count must be taken before she is given a blood transfusion.

3. Is a full blood count adequate to diagnose the cause of the anaemia, or should other investigations be done?

In most cases a full blood count is adequate. The majority of patients who have anaemia without a history of bleeding, are iron deficient. A full blood count will confirm the diagnosis of iron deficiency.

4. What should be done if a patient presents before 36 weeks gestation with a haemoglobin concentration below 8 g/dl?

If the patient is not short of breath and does not have a tachycardia above 100 beats per minute, she may be managed at a high-risk clinic. After blood has been sampled for a full blood count, she should be prescribed 2 ferrous sulphate tablets three times a day. With this treatment the patient should have corrected her haemoglobin concentration before she goes into labour.

5. What should be done if a patient presents before 36 weeks gestation with shortness of breath, tachycardia and a low haemoglobin concentration?

The patient must be admitted to hospital for a blood transfusion. This is necessary because the patient has shortness of breath and tachycardia which suggest heart failure. Again, a full blood count must be done before the transfusion is started.

Case study 3

A patient presents for her first antenatal visit and gives a history that she has a 'leaking heart' due to rheumatic fever as a child. As she has no symptoms and does not get short of breath on exercise, she is reassured and managed as a low-risk patient. As she remains well with no shortness of breath, she is told that she can be delivered by a midwife obstetric unit (primary perinatal care clinic).

1. Why is the management incorrect?

With her history of rheumatic fever and a ‘leaking heart’, the patient must be examined by a doctor to determine whether she has heart valve disease.

Undiagnosed heart valve disease can result in serious complications such as pulmonary oedema.

2. What should be done if the patient has a heart murmur due to heart valve disease?

The type of heart valve disease must be diagnosed. If the patient needs medication, the correct drug must be prescribed in the correct dosage. She must be managed as a high-risk patient and should be carefully followed up for symptoms or signs of heart failure.

3. Will most patients with heart valve disease give a history of previous rheumatic fever?

No. Although most heart valve disease is caused by rheumatic fever during childhood, most of these patients are not aware that they have had rheumatic fever.

4. Is it safe to deliver a patient with heart valve disease at a primary care clinic?

No. Special management is needed in at least a secondary hospital with specialist care available.

Case study 4

An obese 35 year old multiparous patient presents with 1+ glycosuria at 20 weeks of gestation. At the previous antenatal visit she had no glycosuria. A random blood glucose concentration is 7.5 mmol/l. She is reassured and followed up as a low-risk patient. At 28 weeks she has 3+ glycosuria. As the random blood glucose concentration at 20 weeks was normal, she is again reassured and asked to come back to the clinic in 2 weeks.

1. Do you agree with the management at 20 weeks gestation?

Yes, the patient was correctly managed when a random blood glucose concentration was measured after she had 2+ glycosuria. When 1+ glycosuria or more is present again, later in pregnancy, a random blood glucose concentration must be measured again.

2. How should the patient have been managed at 28 weeks?

She should have had another random blood glucose concentration measurement. Further management would depend on the result of this test.

3. Why should a patient be investigated if she has 1+ glycosuria or more for the first time?

The patient may already be a diabetic with a high blood glucose concentration causing the glycosuria.

4. What should the management have been if her random blood glucose was 9.0 mmol/l at 28 weeks gestation?

The patient should be seen the next morning after fasting from midnight. Her fasting blood glucose concentration should then be measured.

5. If the patient has a fasting blood glucose concentration of 7.0 mmol/l, what should her further management be?

The result is abnormal but is not high enough to diagnose diabetes. She should, therefore, be placed on a 7600 kilojoule per day diabetic diet. A glucose profile must be obtained after 2 weeks and this should be repeated every 4 weeks until delivery.

Appendix

Guidelines for the management of patients with risk factors and medical problems during pregnancy, labour and the puerperium

The following tables list most of the risk factors and medical problems which may occur during pregnancy, labour and the puerperium. They also give the possible adverse effects of these conditions, indicate the actions needed, and suggest the level of care required. The tables should be read but need not be learned. These tables provide a very useful reference for both midwives and doctors who are caring for patients with risk factors.

The following list gives risk factors which may occur during pregnancy together with their possible adverse effects and assorted problems, and actions which can lead to the prevention, early diagnosis and correct management of complications. The level of care required by the patient is noted in the last column. The list also serves as a useful guide to management, and can be referred to when risk factors are present or develop during pregnancy. The management of many of the problems is discussed in more detail elsewhere in the Perinatal Education Programme.

The level of care needed is shown as follows:

- 1 = For low-risk patients
- 2 = For intermediate-risk patients
- 3 = For high-risk patients

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
Risk factors identified from the patient's history			
<i>Maternal age</i>			
15 years or less	Pregnancy may have a detrimental effect on the development of the patient's personality.	Determine the duration of pregnancy. If 20 weeks or less termination may be indicated.	2
16-19 years	Poor social circumstances. Pre-eclampsia. Anaemia.	Refer to social worker for support. Watch for proteinuria and a rise in blood pressure from 28 weeks. Regular Hb checks.	1
37 years or more	Medical conditions such as hypertension and diabetes are commoner.	Carefully look for medical problems at the first visit, and at 28 and 34 weeks Motivate for sterilisation.	2
37 years or more	Chromosome abnormalities are commoner, e.g. Down syndrome	Determine the duration of pregnancy: If 13 weeks or less, an ultrasound examination for nuchal thickness is done, followed at 22 weeks looking for structural defects. If more than 13 weeks, a genetic amniocentesis should be done between 16 and 22 weeks. Before referral, make sure that the patient will agree to termination of pregnancy, if this is indicated.	2
<i>General history</i>			
Allergies	Penicillin allergy with an anaphylactic reaction is always	Allergies must always be clearly documented on the folder and antenatal card.	1

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
	dangerous, but rarely occurs.		
Body Mass Index (BMI)	Cephalopelvic disproportion and shoulder dystocia. Hypertension and diabetes Use weight, height and attached BMI table. When reading BMI off table: With 1st visit in 2nd trimester, subtract 4 kg With 1st visit in 3rd trimester, subtract 8 kg	Ultrasound examination for accurate gestational age estimation at 18-22 weeks. Monitor for hypertension and glycosuria. 1 2 3	
Diabetes mellitus (in the patient)	Pregnancy worsens the diabetes. Insulin requirements increase. Higher incidence of fetal death. Large babies with obstructed labour and birth injuries. Neonatal hypoglycaemia.	Careful control of the diabetes, in order to keep the blood glucose levels as close to normal as possible is absolutely essential.	3
Diabetes mellitus (family history)	There is an increased risk of the patient developing diabetes during pregnancy.	Careful screen for glycosuria: If absent – If present –	1 2

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
Epilepsy	Convulsions may occur more frequently in pregnancy. Some anticonvulsant drugs may cause congenital abnormalities.	The dose of anticonvulsant drugs may need to be increased. Put the patient on a safe drug before pregnancy (e.g. carbamazepine). The drugs are not changed during pregnancy because of the danger of convulsions.	2
Congenital abnormalities (in the family)	Serious abnormalities tend to recur.	Arrange for ultrasound and amniocentesis at 16 weeks: If normal – If abnormal –	1 2
Drugs or medication	Danger of teratogenesis. Points towards a disease NOT mentioned in the history.	Get accurate details and consult a doctor.	1
HIV	Mother-to-child transmission of HIV. With AIDS the mother's clinical condition may deteriorate.	Join a prevention of mother-to-child transmission programme. Refer to an antiretroviral (ARV) clinic for HAART. The stage of disease needs to be determined and noted. Check at each visit for symptoms and signs indicating progression at a more advanced stage of disease.	1 2
Auto-immune diseases	Raised perinatal mortality rate. Early onset of severe pre-eclampsia.	Get detailed information about the disease and medication.	3
Psychiatric illness	Suicide is commoner.	Get detailed information about the disease and medication.	2

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
	Illness may become worse during pregnancy.	Termination of pregnancy may be indicated (if duration of pregnancy is less than 20 weeks).	
Rubella	Congenital abnormalities.	Ask about fever and a skin rash in the first trimester of pregnancy and also about contact with rubella. Antibody titres can confirm or exclude diagnosis.	1
Thyrotoxicosis (hyperthyroidism)	Thyrotoxicosis and/or goitre in the neonate.	Get detailed information about the illness and medication. Thyroid hormone levels in cord blood.	2
Systematic history			
<i>Respiratory System</i>			
Asthma	Prostaglandin F2 alpha is contra-indicated. Asthma usually improves during pregnancy.	Ask about medication and symptoms: Asymptomatic and not on steroids – Symptomatic and on steroids –	1 2
Chronic cough more than 21 days. Night sweats and weight loss.	Possible tuberculosis and/or AIDS.	Single X-ray chest with fetus screened off and sputum for TB bacilli. A rapid test if HIV status unknown.	1
Active tuberculosis	Spread to other family members and the newborn infant.	If stable and on treatment. The newborn infant must be given isoniazid.	1
<i>Cardiovascular System</i>			
Hypertension: 1. Diastolic 90 mm Hg or more.	Pre-eclampsia, abruptio placentae,	Change to alpha methyldopa and stop diuretics:	2

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
2. Antihypertensive treatment.	and IUGR or perinatal death.	With good control and no proteinuria – With diastolic 90 mm Hg or more or proteinuria –	3
Dyspnoea and orthopnoea	Symptoms of heart failure.	Underlying heart disease must be excluded or confirmed by the doctor.	2
Rheumatic heart disease	Cardiac output increases with increased risk of cardiac failure and maternal death.	No symptoms or signs of heart failure, and no stenotic heart valve lesions – Symptoms and signs of heart failure and/or stenotic heart valve lesions –	2 3
Varicose veins	May indicate previous venous thrombosis. Become worse during pregnancy.	Watch for possible thrombosis. Bedrest and elastic stockings.	1
Thrombo-embolism	Increased incidence in pregnancy with risk of maternal death.	Anticoagulant therapy during pregnancy may have to be considered.	3
<i>Alimentary System</i>			
Haemorrhoids	May get worse in pregnancy. May prolapse and thrombose.	Only conservative management needed.	1
Jaundice	Danger if the patient is a carrier of the hepatitis B virus. Can infect the infant during delivery.	Test for the hepatitis B antigen: If antigen absent – If antigen present (the infant must be given hyperimmune globulin and be immunised) –	1 2
HIV positive and on HAART	High risk for serious liver damage	Stop nevirapine and refer to an ARV clinic	2
<i>Urinary system</i>			

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
Pyelonephritis	High risk of recurrence.	Midstream urine (MSU) for culture to be sure that the infection is completely treated.	1
Cystitis	Common in pregnancy.	MSU for culture if symptomatic.	1
<i>Surgical History</i>			
Myomectomy	Danger of ruptured uterus.	Elective caesarean section indicated.	2
Diabetes mellitus	Recurs in successive pregnancies. Complications already mentioned.	Random blood glucose if there is glycosuria.	2
Thyroidectomy	Hypothyroidism can develop during pregnancy with the danger of abortion.	If hyperthyroidism was the indication for surgery, manage as for thyrotoxicosis. Look carefully for an operation scar. Thyroid function tests are indicated.	2
Chest surgery	High risk of thrombosis of artificial heart valves in pregnancy.	Warfarin: danger of teratogenesis in the 1st and bleeding in the 3rd trimester. Correct use of anticoagulant therapy.	3
Previous obstetric history			
Abruption placentae	Tends to recur: 10% chance after 1 previous abruption. 25% chance after 2 previous abruptions.	Advise the patient: Induce labour at 38 weeks. Deliver at 34 weeks, antenatal steroids for lung maturity must be given –	2 3
Ectopic pregnancy	High risk of recurrence.	Gynaecological examination to confirm intra-uterine pregnancy (ultrasound if uncertain).	1
Grande multiparity (5 or more pregnancies)	Medical conditions are commoner.	Motivate for sterilisation. Look for medical conditions at the first visit.	2

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
have reached viability)	Obstetric complications are commoner: IUGR, multiple pregnancy, abnormal lie, obstructed labour and postpartum haemorrhage.	Look for abnormal lie after 34 weeks.	
Infertility	Ectopic pregnancy and multiple pregnancy commoner	Gynaecological examination to confirm intra-uterine pregnancy and the size of the uterus. (Ultrasound examination is indicated.)	2
Caesarean section(s)	Danger of ruptured uterus with previous vertical uterine incision, or with two or more caesarian sections.	Get details of the indication and type of incision from old records. Elective caesarean section at 39 weeks if 2 previous caesarean sections or a vertical incision.	2
Congenital abnormalities	Possible genetic inheritance. High risk of recurrence.	Genetic counselling. Amniocentesis and ultrasound may be useful.	2
Abortion	More than two first trimester abortions. One or more mid-trimester abortions.	Genetic amniocentesis indicated. If history indicates an incompetent cervix, a MacDonald stitch may be indicated (inserted at 14-16 weeks).	2 2
Perinatal death	Highest risk group for another perinatal death to occur (especially when the cause is unknown).	Get a detailed history and the notes from the previous pregnancy.	2

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
Postpartum haemorrhage and retained placenta	Tend to recur in successive pregnancies.	Deliver in hospital.	2
Pre-eclampsia	<p>Two groups:</p> <ol style="list-style-type: none"> 1. Primigravidae with pre-eclampsia close to term. 2. Previous pregnancy with pre-eclampsia developing in late 2nd or early 3rd trimester of pregnancy. 	<p>Low risk of recurrence.</p> <p>High risk of recurrence. Low dose aspirin (Disprin) 75 mg daily from 14 weeks.</p>	<p>1</p> <p>2</p>
Primigravida	Higher incidence of pre-eclampsia late in pregnancy.	Careful attention to blood pressure and proteinuria.	1
Vacuum extraction or forceps delivery	May indicate cephalopelvic disproportion.	Careful use of the partogram in labour.	1
Preterm labour	High risk of a recurrence in the same pregnancy.	Assess the cervix regularly from 26 to 32 weeks for changes, more regular bed rest, no intercourse in the second half of pregnancy. If there is cervical incompetence, a MacDonald suture may be indicated.	
Present obstetric history			
Antepartum haemorrhage	Abruptio placentae and placenta praevia are both serious complications. Local causes, e.g. vaginitis,	<p>If not currently bleeding and there is no fetal distress:</p> <ol style="list-style-type: none"> 1. Do speculum examination: No local cause. Treatable local cause present. 2. Sonology shows placenta praevia. 	<p>2</p> <p>1</p> <p>3</p>

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
	cervicitis, can also cause bleeding.		
Asymptomatic bacteriuria	33% incidence of pyelonephritis in these patients. High risk of preterm labour.	Course of antibiotics. Repeat urine culture at next antenatal visit.	1
Diastolic blood pressure of 90 mm Hg or more	Hypertension or pre-eclampsia.	Repeat after 30 minutes rest on her side: If diastolic 90-99 mmHg without proteinuria, start alpha methyl dopa. If diastolic 100 mmHg or more or proteinuria, admit to hospital.	2 2
Reduced fetal movements	Fetal distress or intra-uterine death.	Duration of pregnancy 28 weeks or more. Repeat kick charts: Good count without IUGR. Good count with IUGR. If count remains poor, admit to hospital.	1 2 2
Glycosuria 3+ or more	Probable diabetes.	Random blood glucose estimation: 8 to 11 mmol/l – arrange for fasting blood glucose estimation. 11 mmol/l or more = diabetes. Admit to hospital for control if diabetes diagnosed.	1 2
Glycosuria 1+ and 2+	Possible diabetes.	Arrange for random blood glucose estimation. Less than 8 mm/l is normal.	1
Haemoglobin less than 10 g/dl	Anaemia in pregnancy.	Arrange full blood count. If confirmed anaemia – Refer.	2
Haematuria	Possible cystitis. Bilharzia, if endemic in the area.	Urine microscopy and culture. Treat cystitis.	1

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
Multiple pregnancy	Greater risk of preterm labour. High incidence of perinatal death and pre-eclampsia. Anaemia.	Regular vaginal examinations from 26 weeks for cervical effacement and dilatation. Careful monitoring of proteinuria and rising blood pressure. Do Hb more frequently. Ultrasound examination for growth and chorionicity: Monochorionic (one placenta) Dichorionic (two placentas)	3 2
Pyelonephritis in current pregnancy	High risk of recurrence.	Follow-up urine culture to ensure that treatment was successful.	2
Polyhydramnios	Congenital abnormalities. Multiple pregnancy. Diabetes mellitus. Rh sensitisation may be present.	Ultrasound examination and random blood glucose estimation are indicated. Check blood groups, and possible sensitisation. Exclude oesophageal atresia in the infant immediately after birth.	2
Proteinuria	Pre-eclampsia or renal disease, e.g. chronic nephritis or nephrosis, may be present.	Exclude urinary tract infection. Test urine for protein: Trace (150 mg/l) can be normal. 1+ (500 mg/l) and blood pressure normal. More than 1 + indicates pre-eclampsia or serious kidney disease. Admit to hospital.	1 2 2
Ruptured membranes	Preterm labour and chorioamnionitis.	If 36 weeks or more admit to hospital, wait until the membranes have been ruptured for 6 hours, then induce labour with oxytocin.	1 2

Risk factors	Possible adverse effects during pregnancy and associated problems	Action	Level of care
		If 34 weeks or less transfer to level 2 hospital.	
Rhesus negative	Rh-sensitisation with hydrops fetalis.	If no antibodies, retest for antibodies at 26, 32 and 38 weeks. If antibodies present: Titre less than 1:16. Titre above 1:16 or more.	1 2 3
Preterm labour	Preterm infant.	If 34 weeks or more deliver in level 2 hospital. If less than 34 weeks admit to level 3 hospital. Consider suppression of labour with a beta2 stimulant.	2 3
VDRL and FTA/ TPHA positive, or VDRL titre 1:16 or more	Congenital syphilis.	Patient must receive full treatment.	1

BMI table

Height →	140	145	150	155	160	165	170	175	180	185	190	195	200	205
Weight ↓	cm													
48 kg	24.5	22.8	21.3	20.0	18.7	17.6	16.6	15.7	14.8	14.0	13.3	12.6	12.0	11.4
51 kg	26.0	24.3	22.7	21.2	19.9	18.7	17.6	16.7	15.7	14.9	14.1	13.4	12.8	12.1
54 kg	27.6	25.7	24.0	22.5	21.1	19.8	18.7	17.6	16.7	15.8	15.0	14.2	13.5	12.8
57 kg	29.1	27.1	25.3	23.7	22.3	20.9	19.7	18.6	17.6	16.7	15.8	15.0	14.3	13.6
60 kg	30.6	28.5	26.7	25.0	23.4	22.0	20.8	19.6	18.5	17.5	16.6	15.8	15.0	14.3
63 kg	32.1	30.0	28.0	26.2	24.6	23.1	21.8	20.6	19.4	18.4	17.5	16.6	15.8	15.0
66 kg	33.7	31.4	29.3	27.5	25.8	24.2	22.8	21.6	20.4	19.3	18.3	17.4	16.5	15.7
69 kg	35.2	32.8	30.7	28.7	27.0	25.3	23.9	22.5	21.3	20.2	19.1	18.1	17.3	16.4
72 kg	36.7	34.2	32.0	30.0	28.1	26.4	24.9	23.5	22.2	21.0	19.9	18.9	18.0	17.1
75 kg	38.3	35.7	33.3	31.2	29.3	27.5	26.0	24.5	23.1	21.9	20.8	19.7	18.8	17.8
78 kg	39.8	37.1	34.7	32.5	30.5	28.7	27.0	25.5	24.1	22.8	21.6	20.5	19.5	18.6
81 kg	41.3	38.5	36.0	33.7	31.6	29.8	28.0	26.4	25.0	23.7	22.4	21.3	20.3	19.3
84 kg	42.9	40.0	37.3	35.0	32.8	30.9	29.1	27.4	25.9	24.5	23.3	22.1	21.0	20.0
87 kg	44.4	41.4	38.7	36.2	34.0	32.0	30.1	28.4	26.9	25.4	24.1	22.9	21.8	20.7
90 kg	45.9	42.8	40.0	37.5	35.2	33.1	31.1	29.4	27.8	26.3	24.9	23.7	22.5	21.4
93 kg	47.4	44.2	41.3	38.7	36.3	34.2	32.2	30.4	28.7	27.2	25.8	24.5	23.3	22.1
96 kg	49.0	45.7	42.7	40.0	37.5	35.3	33.2	31.3	29.6	28.0	26.6	25.2	24.0	22.8
99 kg	50.5	47.1	44.0	41.2	38.7	36.4	34.3	32.3	30.6	28.9	27.4	26.0	24.8	23.6
102 kg	52.0	48.5	45.3	42.5	39.8	37.5	35.3	33.3	31.5	29.8	28.3	26.8	25.5	24.3
105 kg	53.6	49.9	46.7	43.7	41.0	38.6	36.3	34.3	32.4	30.7	29.1	27.6	26.3	25.0
108 kg	55.1	51.4	48.0	45.0	42.2	39.7	37.4	35.3	33.3	31.6	29.9	28.4	27.0	25.7
111 kg	56.6	52.8	49.3	46.2	43.4	40.8	38.4	36.2	34.3	32.4	30.7	29.2	27.8	26.4
114 kg	58.2	54.2	50.7	47.5	44.5	41.9	39.4	37.2	35.2	33.3	31.6	30.0	28.5	27.1
117 kg	59.7	55.6	52.0	48.7	45.7	43.0	40.5	38.2	36.1	34.2	32.4	30.8	29.3	27.8
120 kg	61.2	57.1	53.3	49.9	46.9	44.1	41.5	39.2	37.0	35.1	33.2	31.6	30.0	28.6

Height →	140	145	150	155	160	165	170	175	180	185	190	195	200	205
Weight ↓	cm													
123 kg	62.8	58.5	54.7	51.2	48.0	45.2	42.6	40.2	38.0	35.9	34.1	32.3	30.8	29.3
126 kg	64.3	59.9	56.0	52.4	49.2	46.3	43.6	41.1	38.9	36.8	34.9	33.1	31.5	30.0

Test 1: Antenatal care

1. An extra-uterine pregnancy is suggested by:
 - a. A uterus that is larger than expected for the duration of pregnancy.
 - b. Morning sickness and breast tenderness.
 - c. Lower abdominal pain and vaginal bleeding.
 - d. The absence of fetal movements.
2. A woman should book for antenatal care:
 - a. Before she falls pregnant.
 - b. When she has missed her second menstrual period.
 - c. When she first feels fetal movements.
 - d. When she is 28 weeks pregnant.
3. When a patient has had a caesarean section:
 - a. The type of uterine incision is of no importance.
 - b. Only those patients who had a vertical lower segment incision may be allowed to labour normally.
 - c. Only those patients who had a transverse lower segment incision may be allowed to labour normally.
 - d. Only those patients who had a transverse lower segment incision for a non-recurring indication may be allowed to labour normally.
4. Which of the following risk factors from a patient's past obstetric history carries the highest risk in a subsequent pregnancy?
 - a. A previous caesarean section.
 - b. An infant weighing more than 4000 g at birth.
 - c. A previous perinatal death.
 - d. A previous ectopic pregnancy.
5. A woman books for antenatal care at 12 weeks gestation. Which of the following in her present obstetric history would worry you most?
 - a. Flu-like symptoms associated with a rash.
 - b. Nausea and vomiting in the mornings.
 - c. Heartburn and constipation.
 - d. Slight ankle oedema.
6. The last normal menstrual period may be used to calculate the duration of pregnancy:
 - a. If that was the last menstrual period while the patient was on her last packet of oral contraceptive pills.
 - b. If the patient has a regular cycle and she was not on contraceptives.

- c. If the last menstrual period had started earlier and had been shorter than the patient would have expected.
 - d. Patient information about their last menstrual period is always wrong.
7. A cervical smear for cytology must be done during the first antenatal visit as part of the gynaecological examination:
- a. In all women.
 - b. Only if the cervix appears abnormal.
 - c. In all women 30 years or more who have not had a previous smear which was reported as normal.
 - d. Only if there is a symptomatic vaginal discharge (e.g. itchy or burning).
8. The abdominal examination is a useful assessment of the duration of pregnancy:
- a. From 8–12 weeks.
 - b. From 10–16 weeks.
 - c. From 13–17 weeks.
 - d. From 18–24 weeks.
9. If a patient is 10 weeks pregnant:
- a. The fundus will be palpable 2 cm above the pelvic symphysis.
 - b. The fundus is not palpable abdominally and it is, therefore, not possible to determine whether the dates correlate with the size of the uterus.
- c. It would be better to ask her to return in 6 weeks time for booking.
- d. The uterine size may be determined by doing a bimanual vaginal examination with fair accuracy.
10. The best method of assessing the duration of pregnancy by physical examination at 18 or more weeks is:
- a. The symphysis-fundus measurement.
 - b. Bimanual palpation of the uterus on vaginal examination.
 - c. Palpation of the abdomen.
 - d. To establish the lie of the fetus and assess the size of the fetal head.
11. If the uterine fundus is just below the umbilicus (20 weeks) and the patient is 18 weeks pregnant by dates:
- a. The dates must be considered correct and used to determine the duration of pregnancy.
 - b. The fundal height must be considered correct and used to determine the duration of pregnancy.

- c. An ultrasound examination must be requested and the result used to determine the duration of pregnancy.
 - d. The average duration of 19 weeks must be accepted as the correct duration of pregnancy.
12. A uterus that is smaller than expected may be due to:
- a. A breech presentation.
 - b. An intra-uterine death.
 - c. Polyhydramnios.
 - d. None of the above.
13. Antenatal ultrasound examination is an accurate method of determining the duration of pregnancy up to:
- a. 28 weeks.
 - b. 24 weeks.
 - c. 20 weeks.
 - d. 16 weeks.
14. During the antenatal period ultrasonography must be done between 18 and 22 weeks:
- a. On very obese patients where determination of the duration of pregnancy is difficult.
 - b. On patients needing elective delivery, e.g. those with 2 previous caesarean sections.
 - c. On patients with a history of severe pre-eclampsia before 34 weeks gestation.
 - d. In all of the above patients.
15. Which of the following results indicate active syphilis?
- a. A negative RPR.
 - b. A positive RPR plus a negative TPHA.
 - c. A positive RPR plus a positive TPHA.
 - d. A CIN III lesion on cervical cytology smear.
16. A positive VDRL indicates the presence of syphilis if:
- a. The titre is 1:4 or more.
 - b. The titre is 1:8 or more.
 - c. The titre is 1:16 or more.
 - d. Any titre is present.
17. Syphilis in pregnancy should be treated with:
- a. Nitrofurantoin (Macrobid).
 - b. Benzathene penicillin (Bicillin LA or Penilente LA).
 - c. Tetracycline.
 - d. Ampicillin.
18. Blood should be taken to determine the presence of anti-D antibodies at 26, 32 and 38 weeks in:
- a. All Rh-negative patients with an anti-D titre of 1:8 or more.
 - b. All Rh-negative patients.
 - c. All Rh-positive patients.
 - d. All pregnant patients.
19. How often should a woman at low risk, who lives near a clinic, visit

- the antenatal clinic between 28 and 34 weeks?
- Weekly.
 - Every 2 weeks.
 - Once a month.
 - No visit is required between these dates.
20. The visit at 34 weeks is important because:
- The fetus now becomes viable and the patient must monitor the fetal movements.
 - A vaginal examination must be done on patients who are at risk of preterm labour to determine whether there are cervical changes.
 - The lie and presentation of the fetus are now important and have to be carefully determined.
 - A repeat ultrasound examination must now be done on patients who had ultrasonography at 18 and 22 weeks.

Test 2: Assessment of fetal growth and condition during pregnancy

1. What is normal fetal growth?
 - a. Will be present if a patient gains weight during pregnancy.
 - b. The fetal weight is within the expected range of the duration of the pregnancy.
 - c. Can only be accurately assessed by regular ultrasound assessment.
 - d. Will be present if the amount of liquor is normal.
2. Which of the following maternal factors can cause intra-uterine growth restriction?
 - a. Tobacco smoking.
 - b. Alcohol intake.
 - c. Pre-eclampsia.
 - d. All of the above.
3. Which of the following statements about intra-uterine growth restriction is correct?
 - a. The cause of severe intra-uterine growth restriction is usually unknown.
 - b. Both maternal and fetal factors may cause intra-uterine growth restriction.
- c. Primary placental insufficiency is a common cause of intra-uterine growth restriction.
- d. Poor maternal weight gain during pregnancy is of great value in the diagnosis of intra-uterine growth restriction.
4. Which of the following is the best clinical method of determining uterine growth between 18 and 36 weeks of pregnancy?
 - a. An abdominal examination.
 - b. The distance in centimetres between the upper edge of the symphysis pubis and the fundus of the uterus.
 - c. Recording the fetal heart rate at each antenatal visit.
 - d. The abdominal circumference measured with a tape at each antenatal visit.
5. The ability to detect abnormalities in symphysis-fundus growth is improved if:
 - a. More persons are involved in assessing patients at antenatal visits.
 - b. Patients are also weighed at each antenatal visit.
 - c. The same person sees the patient at every antenatal visit.
 - d. Ultrasound examinations are done at every second visit.
6. Which of the following symphysis-fundus height measurements is

- used to screen for intra-uterine growth restriction?
- A slowing of the symphysis-fundus growth until two measurements are below the 10th centile.
 - A slowing of the symphysis-fundus growth until one measurement is below the 10th centile.
 - Two measurements the same irrespective of their positions on the centile lines.
 - A measurement that is less than that recorded two visits before and falls below the 10th centile.
7. With severe intra-uterine growth restriction, the difference between the gestational age and the symphysis-fundus height measurement is:
- 2 weeks or more.
 - 3 weeks or more.
 - 4 weeks or more.
 - 5 weeks or more.
8. Does descent of the presenting part affect your interpretation of the symphysis-fundus growth?
- Yes, after 36 weeks with progressively less fetal head palpable above the pelvic inlet the criteria to diagnose intra-uterine restriction will no longer be valid.
 - No, the curve is designed to take descent of the presenting part into account.
- c. No, as it is no longer necessary to palpate the amount of fetal head palpable above the pelvic inlet once it has been established that it is not a breech presentation at 34 weeks.
- d. No, as palpation of the amount of fetal head above the pelvic inlet is inaccurate.
9. What action is required if the symphysis-fundus height measurement at a gestational age of 30 weeks suggests intra-uterine growth restriction?
- Patients who smoke should stop smoking.
 - Give advice about a high-energy diet and if necessary food parcels.
 - Careful attention must be given to counting fetal movements.
 - All of the above.
10. If the symphysis-fundus measurement suggests intra-uterine growth restriction at 32 weeks gestation, what is the correct management?
- A vaginal examination must be done to determine whether the patient's cervix is favourable for an induction.
 - The patient must return to the antenatal clinic at 36 weeks.
 - Fetal heart rate monitoring must be done at each antenatal visit.
 - The patient must be transferred to a level 2 hospital for a Doppler

- umbilical artery blood flow measurement.
11. What should be done if measures to improve symphysis-fundus growth were unsuccessful?
 - a. Nothing as the fetus is small but healthy.
 - b. With moderate intra-uterine growth restriction and good fetal movements delivery at 38 weeks should be considered.
 - c. The patient can continue to smoke and no further action is required.
 - d. Pre-eclampsia can be excluded as intra-uterine growth restriction and pre-eclampsia never occur together.
 12. The fetal condition can best be determined during the antenatal period by:
 - a. Weighing the patient at every antenatal visit.
 - b. Measuring the patient's blood pressure.
 - c. Counting the fetal heart rate.
 - d. Counting fetal movements.
 13. During the antenatal period it is essential to determine the fetal condition from:
 - a. 36 weeks.
 - b. 34 weeks.
 - c. 28 weeks.
 - d. 24 weeks.
 14. Which of the following statements about fetal movements is correct?
 - a. The date when fetal movements are first felt is a good indication of the gestational age.
 - b. Good fetal movements do not necessarily indicate fetal wellbeing.
 - c. All patients should be told about the importance of fetal movements.
 - d. A decrease in fetal movements always indicates that the fetus is distressed.
 15. Which patients should use a fetal movement chart?
 - a. All patients where there is reason to be worried about the fetal condition.
 - b. All primigravidas.
 - c. All pregnant patients from 28 weeks gestation.
 - d. All patients who have had a previous caesarean section.
 16. When during the day would you advise a patient to count fetal movements?
 - a. Fetal movement should be counted and recorded for a period of an hour per day after breakfast.
 - b. Fetal movement should be counted and recorded for a period of an hour per day before breakfast.

- c. Fetal movement should be counted and recorded for a period of an hour per day after lunch.
 - d. Fetal movement should be counted and recorded for a period of an hour per day after supper.
17. How would you advise a patient to count fetal movements?
- a. She should preferably do it together with other work as physical activity stimulates the fetus to move.
 - b. She should preferably do it while resting on her side.
 - c. She should preferably do it while lying flat on her back.
 - d. While commuting to work in a taxi.
18. When will you be worried that a patient may have a decreased number of fetal movements?
- a. 15–20 movements per hour.
 - b. 10–15 movements per hour.
 - c. 5–10 movements per hour.
 - d. Half as many fetal movements as previously counted.
19. What would you advise if a patient felt only a few fetal movements during an hour?
- a. The patient must go to her nearest clinic immediately and report that her fetus is only moving a little.
 - b. The patient should lie on her side for a further hour and count the fetal movements.
 - c. The patient should repeat the fetal movement count in the afternoon.
 - d. Antenatal fetal heart rate monitoring is indicated and, therefore, she must report to her nearest hospital.
20. What management would be correct if a patient with reduced fetal movements presents at a hospital that does not have a cardiotocograph (CTG machine)?
- a. The responsible doctor must see the patient immediately as a caesarean section should be done.
 - b. Refer the patient urgently to a hospital that has a cardiotocograph.
 - c. Exclude the possibility of fetal death by listening for the fetal heart with a stethoscope.
 - d. Fetal movements must be counted again the next day.

Test 3: **Hypertensive** **disorders of** **pregnancy**

1. What is the definition of hypertension in pregnancy?
 - a. A diastolic blood pressure of 80 mm Hg or above and/or a systolic blood pressure of 120 mm Hg or above.
 - b. A diastolic blood pressure of 90 mm Hg or above and/or a systolic blood pressure of 140 mm Hg or above.
 - c. A diastolic blood pressure of 100 mm Hg or above and/or a systolic blood pressure of 160 mm Hg or above.
 - d. A rise in diastolic blood pressure of 10 mm Hg.
2. What is the definition of significant proteinuria in pregnancy?
 - a. A trace of protein.
 - b. 1+ protein or more.
 - c. 2+ protein or more.
 - d. 3+ protein.
3. How should you define pre-eclampsia?
 - a. Hypertension and proteinuria present before the start of pregnancy.
 - b. Hypertension and proteinuria presenting in the first half of pregnancy.
 - c. Hypertension and proteinuria presenting in the second half of pregnancy.
 - d. Hypertension and proteinuria presenting any time in pregnancy.
4. What is the correct definition of chronic hypertension?
 - a. Hypertension, without proteinuria, that is present in the first half of pregnancy.
 - b. Hypertension together with proteinuria, that is present in the first half of pregnancy.
 - c. Hypertension that is present in the first half of pregnancy plus proteinuria that presents in the second half of pregnancy.
 - d. Hypertension alone, which is present at the time of booking at 28 weeks.
5. How common is pre-eclampsia?
 - a. Most pregnant women develop pre-eclampsia.
 - b. About 25% of all pregnant women develop pre-eclampsia.
 - c. About 5–6% of all pregnant women develop pre-eclampsia.
 - d. Very rare.

6. Which fetal condition is common in pregnancies complicated by pre-eclampsia?
 - a. Congenital malformations.
 - b. Heart failure due to hypertension.
 - c. Haemorrhagic disease of the newborn.
 - d. Intra-uterine growth restriction.
7. Pre-eclampsia may cause fetal distress because it results in:
 - a. Decrease in placental blood flow.
 - b. Fetal hypertension.
 - c. Severe protein loss in the mother's urine.
 - d. Congenital abnormalities caused by antihypertensive drugs.
8. A patient with pre-eclampsia who develops a diastolic blood pressure of 105 mm Hg and 2+ proteinuria at 36 weeks of pregnancy should be graded as having:
 - a. Pre-eclampsia.
 - b. Severe pre-eclampsia.
 - c. Imminent eclampsia.
 - d. Eclampsia.
9. What is an important sign of imminent eclampsia?
 - a. 3 + proteinuria.
 - b. Increased tendon reflexes.
 - c. A diastolic blood pressure of 110 mm Hg or more.
 - d. Tenderness on palpating the calves.
10. A patient with pre-eclampsia has a diastolic blood pressure of 95 mm Hg and 1+ proteinuria. She complains of flashes of light in front of her eyes and upper abdominal pain. In which of the following grades of pre-eclampsia should you put this patient?
 - a. Pre-eclampsia.
 - b. Severe pre-eclampsia.
 - c. Imminent eclampsia.
 - d. Eclampsia.
11. Which of the following women has the highest risk of pre-eclampsia?
 - a. A patient with a history of pre-eclampsia starting early in the third trimester of a previous pregnancy.
 - b. A patient with a history of a preterm delivery in her previous pregnancy.
 - c. Grande multiparas.
 - d. A patient who previously had a twin pregnancy.
12. Which one of the following may be an early warning sign of pre-eclampsia?
 - a. Weight loss during the last months of pregnancy.
 - b. Generalised oedema especially of the face.
 - c. Oedema of the feet at the end of the day.
 - d. Pain on passing urine.

13. What is the management of a patient with pre-eclampsia?

 - a. Oral antihypertensive drugs.
 - b. Diuretics to reduce oedema.
 - c. Hospitalisation.
 - d. A loading dose of magnesium sulphate.
14. What is an important complication of pre-eclampsia?

 - a. Placenta praevia.
 - b. Oedema of the face.
 - c. Glycosuria.
 - d. Intracerebral haemorrhage.
15. What is management of a patient with severe pre-eclampsia?

 - a. Prevent eclampsia by giving magnesium sulphate.
 - b. Prevent intracerebral haemorrhage by decreasing the blood pressure.
 - c. Transfer the patient to hospital.
 - d. All of the above.
16. What drug is used to manage a diastolic blood pressure of 110 mm Hg or more or a systolic blood pressure of 160 mm Hg or more?

 - a. Alpha methyldopa (Aldomet).
 - b. Nifedipine (Adalat).
 - c. Diazepam (Valium).
 - d. Propranolol (Inderal)
17. What is the first step in the management of a patient with eclampsia?

 - a. Give intramuscular phenobarbitone to stop the convulsions.
 - b. Give dihydralazine (Nepresonl) to lower the blood pressure.
 - c. Turn the patient on her side and ensure an open airway.
 - d. Insert a Foley's catheter.
18. What drug is used to prevent and manage eclampsia?

 - a. Magnesium sulphate.
 - b. Magnesium trisilicate.
 - c. Alpha methyldopa (Aldomet).
 - d. Diazepam (Valium).

19. How should a patient, who feels well but has a diastolic blood pressure of 90 mm Hg at 36 weeks gestation, be managed? At all her previous antenatal visits the blood pressure was normal and she has no proteinuria.
- She must be given an intramuscular injection of dihydralazine (Nepresol).
 - She must be hospitalised.
 - Weekly antenatal visits should be arranged with additional visits to measure the blood pressure and check for proteinuria.
 - A full blood count should be done to exclude a low platelet count.
20. A rise in blood pressure or the development of proteinuria in a patient with chronic hypertension:
- Could be a result of the pregnancy and should not be of any concern.
 - Requires urgent referral to hospital.

Test 4: Antepartum haemorrhage

1. What is the definition of an antepartum haemorrhage?
 - a. Any vaginal haemorrhage between conception and delivery.
 - b. Any vaginal haemorrhage during labour.
 - c. Any vaginal haemorrhage between 24 weeks gestation and delivery.
 - d. Any vaginal haemorrhage between 24 weeks and the onset of labour.
2. Antepartum haemorrhage is an important complication of pregnancy because:
 - a. It is a common cause of iron-deficiency anaemia.
 - b. The fetus may become anaemic.
 - c. It may be due to cervical intra-epithelial neoplasia.
 - d. Both the mother and fetus may die.
3. Which of the following is an important sign of shock due to blood loss?
 - a. A fast pulse rate.
 - b. A low haemoglobin concentration.
 - c. Concentrated urine.
 - d. Pyrexia.
4. The initial management of a shocked patient with an antepartum haemorrhage is:
 - a. A speculum examination to rule out a local cause for the antepartum haemorrhage.
 - b. An ultrasound examination must be done in order to localise the placenta.
 - c. Assess whether there is engagement of the fetal head as this could rule out a placenta praevia.
 - d. Put up two intravenous infusions to run in quickly.
5. The amount of bleeding to diagnose an antepartum haemorrhage is:
 - a. A sanitary pad is at least partly soaked with blood.
 - b. A blood-stained vaginal discharge is present.
 - c. A small amount of blood mixed with mucus has been passed.
 - d. Any one of above-mentioned is present.
6. Why is a speculum examination done on a patient with an antepartum haemorrhage?
 - a. To see how dilated the cervix is.
 - b. To exclude a placenta praevia before a digital examination is done.

- c. To exclude a local cause of the bleeding from the vagina or cervix.
 - d. To look for a blood clot in the vagina.
7. If a speculum examination is done on a patient with a history suggestive of a blood-stained discharge, what finding would diagnose an antepartum haemorrhage?
- a. Bleeding from a closed cervical os.
 - b. A blood-stained discharge seen in the vagina.
 - c. Contact bleeding when the speculum touches the cervix.
 - d. Bulging membranes through a partially dilated cervix.
8. What is the most likely cause of a massive antepartum haemorrhage that threatens the mother's life?
- a. Abruptio placentae.
 - b. Rupture of the uterus.
 - c. Cervical carcinoma.
 - d. Placenta praevia.
9. Which of the following factors will place a patient at the highest risk of abruptio placentae?
- a. A history of abruptio placentae in a previous pregnancy.
 - b. Any of the hypertensive disorders of pregnancy.
 - c. Intra-uterine growth restriction.
 - d. Cigarette smoking.
10. Which of the following would suggest an abruptio placentae?
- a. The uterus is tonically contracted and tender.
 - b. Fetal movements are usually present.
 - c. The haemoglobin concentration is low.
 - d. The uterus is relaxed and the fetal heart rate is normal.
11. An antepartum haemorrhage with no fetal heart heard is usually caused by:
- a. Placenta praevia.
 - b. Abruptio placentae.
 - c. Antepartum haemorrhage of unknown cause.
 - d. Trichomonal vaginitis.
12. Which of the following patients is at an increased risk of placenta praevia?
- a. A patient with one of the hypertensive disorders of pregnancy.
 - b. A patient with a multiple pregnancy.
 - c. A patient with intra-uterine growth restriction.
 - d. A patient who smokes.
13. What symptoms point to the diagnosis of placenta praevia?
- a. The bleeding is painless.
 - b. The bleeding consists of dark red blood clots.

- c. The bleeding is associated with severe continuous abdominal pain.
 - d. Fetal movement is absent after the bleed.
14. Vaginal bleeding due to placenta praevia is usually associated with:
- a. Fetal parts that are difficult to feel and an absent fetal heart beat.
 - b. Engagement of the fetal head.
 - c. A uterus that is relaxed and not tender on palpation.
 - d. Lower abdominal pain.
15. In which of the following patients can placenta praevia be excluded?
- a. A patient with a slight vaginal bleed.
 - b. When two fifths or less of the fetal head can be palpated above the pelvic brim on abdominal examination.
 - c. A patient with a painless, bright red vaginal bleed.
 - d. A patient with a breech presentation.
16. What action should you take if a routine ultrasound examination early in pregnancy shows a placenta praevia?
- a. A repeat ultrasound examination must be arranged at 32 weeks.
 - b. No further investigations are required.
- c. Book the patient for an elective caesarean section at 38 weeks.
 - d. Refer the patient to hospital where she will be admitted.
17. How will a patient describe a blood-stained vaginal discharge?
- a. A vaginal bleed that soaks a sanitary towel.
 - b. A slight bleed consisting of blood mixed with mucus.
 - c. A vaginal discharge mixed with a small amount of blood.
 - d. Bleeding after intercourse.
18. Which of the following is typical of a ‘show’?
- a. A heavy vaginal bleed.
 - b. A slight bleed consisting of blood mixed with mucus.
 - c. A mucoid vaginal discharge.
 - d. Blood in the urine.
19. What would you find on speculum examination with a history of a ‘show’?
- a. The cervix is a few centimetres dilated and the membranes are bulging.
 - b. The bleeding will come through a closed cervical os.
 - c. An offensive vaginal discharge.
 - d. Contact bleeding will occur if the cervix is touched.
20. How should you manage a patient who presents at 30 weeks of gestation with a blood-stained

- vaginal discharge which is caused by vaginitis?
- a. The urine should be tested with a reagent strip for protein, nitrites and leucocytes.
 - b. A cytology smear must be taken from the cervix to identify the organism causing the vaginitis.
 - c. A vaginal examination should be done in theatre as with any other patient who presents with an antepartum haemorrhage.
 - d. The patient and her partner must be treated with metronidazole (Flagyl).

Test 5: Preterm labour and preterm rupture of the membranes

1. What is the definition of preterm labour?
 - a. Labour starting one hour or more after rupture of the membranes.
 - b. Labour starting before 40 weeks of gestation.
 - c. Labour starting before 37 weeks of gestation.
 - d. Labour starting when the fetus is assessed as weighing less than 2000 g, when the gestational age is unknown.
2. Preterm rupture of the membranes is defined as:
 - a. Membranes that have ruptured at term, and not been followed by the onset of labour within 24 hours.
 - b. Membranes that rupture before the second stage of labour.
 - c. Membranes that have ruptured before 37 weeks of gestation, in the absence of contractions.
 - d. Membranes that have ruptured before the onset of labour at any gestational age.
3. Preterm labour is important because it commonly results in death of the infant due to:
 - a. Abruptio placae.
 - b. Birth trauma.
 - c. Jaundice.
 - d. Hyaline membrane disease.
4. Chorioamnionitis is usually caused by:
 - a. Bacteria which cross the placenta from the maternal circulation to the fetus.
 - b. Bacteria which spread from the cervix and vagina.
 - c. Viral infection of the genitalia.
 - d. Candida vaginitis.
5. Choose the correct statement regarding chorioamnionitis:
 - a. It causes all cases of preterm labour.
 - b. It always follows preterm rupture of the membranes.
 - c. It may cause and complicate preterm rupture of the membranes.
 - d. It only occurs in patients with vaginitis.
6. Subclinical chorioamnionitis usually results in:
 - a. No signs or symptoms in the mother or fetus.
 - b. Maternal pyrexia and tachycardia.
 - c. An offensive vaginal discharge.
 - d. Abdominal tenderness.

7. Clinical chorioamnionitis may present with:
 - a. Headache and backache.
 - b. Vaginal bleeding.
 - c. Fetal tachycardia.
 - d. Dysuria and frequency.
8. Antibiotics should be given to:
 - a. All patients with preterm rupture of the membranes.
 - b. All infants with preterm labour.
 - c. Patients with clinical signs of chorioamnionitis.
 - d. Patients with ruptured membranes, where the pregnancy is allowed to continue.
9. Which of the following commonly causes preterm labour?
 - a. Multiple pregnancy.
 - b. Excessive weight gain during pregnancy.
 - c. A breech presentation.
 - d. No sexual intercourse in the second half of pregnancy.
10. Which patients are at the highest risk of preterm labour?
 - a. Patients who book early in pregnancy.
 - b. Multigravidae.
 - c. Patients with a history of preterm labour in a previous pregnancy.
 - d. Patients living in low socio-economic circumstances.
11. Women at increased risk of preterm labour should:
 - a. Increase their normal amount of exercise.
 - b. Not take baths.
 - c. Not be examined vaginally at the antenatal clinics.
 - d. Avoid coitus during the second half of their pregnancies.
12. Braxton Hicks contractions:
 - a. Are sometimes uncomfortable but are not painful.
 - b. Are regular.
 - c. Are associated with cervical dilatation.
 - d. Increase in duration and frequency.
13. Preterm labour is present when:
 - a. A patient experiences painful contractions prior to 37 weeks.
 - b. Regular uterine contractions, palpable on abdominal examination prior to 37 weeks is present.
 - c. Regular uterine contractions, palpable on abdominal examination and cervical effacement and/or dilatation on vaginal examination prior to 37 weeks.
 - d. A patient has a history of rupture of the membranes prior to 37 weeks irrespective of whether or not she has uterine contractions.

14. Patients with preterm rupture of the membranes should have:
 - a. A digital vaginal examination to assess the state of the cervix.
 - b. A sterile speculum examination only.
 - c. No vaginal examination at all.
 - d. Only a rectal examination.
15. The pH of amniotic fluid is:
 - a. Acid.
 - b. Neutral.
 - c. Alkaline.
 - d. Variable.
16. How should a patient with preterm labour at a gestational age of 36 weeks be managed?
 - a. The patient should be delivered in a MOU or district hospital.
 - b. The patient should be delivered in a level 1 facility.
 - c. The patient should be referred to a level 2 facility for delivery.
 - d. Preterm labour should be suppressed and the patient transferred to a level 1 facility for further suppression of preterm labour.
17. What should be done if preterm labour has been diagnosed at a primary care antenatal clinic and the patient is less than 34 weeks pregnant?
 - a. Contractions need to be suppressed and the patient referred urgently to a level 2 hospital.
18. How would you decide that a patient is less than 34 weeks pregnant if the duration of the pregnancy is unknown?
 - a. The estimated fetal weight will be less than 2500g and the symphysis-fundus measurement will be less than 34 cm.
 - b. The estimated fetal weight will be less than 2000g and the symphysis-fundus measurement will be less than 33 cm.
 - c. If in doubt the patient should be referred to a level 2 hospital to be evaluated.
 - d. An ultrasound examination needs to be done urgently to establish the correct gestational age.
19. Salbutamol should not be used in a patient with:
 - a. Asthma.
 - b. Preterm rupture of the membranes.

- c. Multiple pregnancy.
 - d. Heart valve disease.
20. What advice should be given to a patient who had a preterm delivery?
- a. If she only had one previous preterm delivery, there is no need to be concerned about future pregnancies.
 - b. There is a high risk of recurrence, it will be better not to attempt future pregnancies.
 - c. Intervention is only required if a patient had two previous preterm deliveries.
 - d. The patient should be seen at a level 2 hospital before her next pregnancy to be assessed for possible causes.

Test 6: The puerperium and family planning

1. Normal lochia:
 - a. Is colourless.
 - b. Has no smell.
 - c. Has an offensive smell.
 - d. Has a non-offensive smell.
2. On day 7 postpartum the size of a normally involuting uterus should correspond to a gestational age of approximately:
 - a. 8 weeks.
 - b. 12 weeks.
 - c. 16 weeks.
 - d. 20 weeks.
3. A normally involuting uterus will be:
 - a. Soft and tender.
 - b. Soft and not tender.
 - c. Firm and tender.
 - d. Firm and not tender.
4. How frequently should a primipara visit the clinic for postpartum care in the puerperium?
 - a. At least daily for 7 days.
 - b. At least daily for 5 days and again on day 7.
 - c. At least on days 1, 3, 5 and 7.
 - d. The patient must be kept in hospital for at least 5 days.
5. Which of the following indicate that puerperal pyrexia is caused by a genital tract infection?
 - a. General malaise.
 - b. Rigors.
 - c. Offensive lochia.
 - d. A marked tachycardia.
6. How must a patient with a urinary tract infection causing puerperal pyrexia be treated?
 - a. Admission to hospital for intravenous broad-spectrum antibiotics.
 - b. Tepid sponging and paracetamol to bring down the temperature at a clinic.
 - c. Oral broad-spectrum antibiotics given to the patient at home.
 - d. Oral broad-spectrum antibiotics and paracetamol given to the patient at home.
7. How should you manage a patient with superficial vein thrombosis?
 - a. Hospitalise the patient for heparin treatment.
 - b. Keep the patient in bed for 5 days.
 - c. Start her on oral ampicillin and metronidazole (Flagyl).
 - d. Give analgesia and support the leg with an elastic bandage.
8. A patient who develops the ‘puerperal blues’ needs to be:
 - a. Referred to a psychiatrist.
 - b. Isolated together with her infant.

- c. Comforted and given an explanation of her feelings.
 - d. Treated with a benzodiazepine (e.g. Ativan).
9. What is a secondary postpartum haemorrhage?
- a. Any vaginal bleeding that appears excessive, after the first hour following delivery of the placenta.
 - b. Any vaginal bleeding that appears excessive, after the first 24 hours following delivery of the placenta.
 - c. Any vaginal bleeding that appears excessive, between the 5th and 15th days of the puerperium.
 - d. Any vaginal bleeding in the puerperium which is severe enough to cause the patient to become shocked.
10. Observations of the presence or absence of offensive lochia in the patient or jaundice in her infant in the puerperium:
- a. Can be made by the patient as well as the midwife.
 - b. Should not be expected from patients as they are too unreliable.
 - c. Should only be made by a midwife or doctor.
 - d. Should only be made by a doctor.
11. The most important aim of family planning is to:
- a. Save money.
 - b. Improve the quality of life for everyone.
- c. Prevent sexually transmitted diseases.
 - d. Ensure that each family has one child only.
12. The correct way to advise a woman regarding a suitable contraceptive method is to:
- a. Ask her which method she would like and then consider if it is a suitable choice.
 - b. Prescribe the method that you think would be the best.
 - c. Suggest that she use Ovral as a postcoital contraceptive.
 - d. Allow her to use whatever method she chooses.
13. One of the very effective contraceptive methods is:
- a. The condom.
 - b. Breastfeeding.
 - c. An intra-uterine contraceptive device.
 - d. Spermicides.
14. Postcoital contraception with Norlevo, E-Gen-C or Ovral should be offered to a woman who has had a single episode of unprotected sexual intercourse:
- a. Five days ago.
 - b. Seven days ago.
 - c. Ten days ago.
 - d. When she misses her next expected period.

15. Lactation is reduced by:
 - a. The progestogen-only pill (minipill).
 - b. An intra-uterine contraceptive device.
 - c. An injectable, e.g. depot progestogen.
 - d. A combined oral contraceptive pill.
16. A common side effect of an intramuscular injection of depo progesterone is:
 - a. Fluid retention and breast tenderness.
 - b. Reduction in lactation.
 - c. Cloasma (a brown mark on the face).
 - d. Amenorrhoea.
17. Tubal ligation causes:
 - a. Menstrual abnormalities.
 - b. Weight gain.
 - c. Headaches.
 - d. None of the above.
18. An advantage of the condom as a method of contraception is that it:
 - a. Is very effective.
 - b. Decreases the risk of sexually transmitted disease.
19. An injectable is a suitable contraceptive method for a woman who:
 - a. Is planning a pregnancy within the next 6 months.
 - b. Is planning a pregnancy in a year's time.
 - c. Has a history of severe depression.
 - d. Is 23 years old with 2 children and wants no further children.
20. When would be the most appropriate time to insert an intra-uterine contraceptive device after delivery?
 - a. Immediately after delivery.
 - b. 2 weeks postpartum.
 - c. 6 weeks postpartum.
 - d. Not earlier than 3 months postpartum.

Test 7: Medical problems during pregnancy and the puerperium

1. A patient with cystitis usually complains of:
 - a. Headache.
 - b. Fever and rigors.
 - c. Dysuria and frequency.
 - d. Backache.
2. Cystitis is treated by:
 - a. Asking the patient to increase her oral fluid intake.
 - b. Prescribing a single oral dose of amoxycillin or co-trimoxazole.
 - c. Giving 2.4 million units of benzathine penicillin intramuscularly.
 - d. Giving ampicillin 1 g intravenously every 6 hours until the symptoms stop.
3. A patient with asymptomatic bacteriuria has:
 - a. No symptoms.
 - b. Fever.
 - c. Nocturia.
 - d. Lower abdominal pain.
4. It is important to treat patients with asymptomatic bacteriuria in pregnancy because:
 - a. The patient is seriously ill.
 - b. One third will develop septic shock during pregnancy.
- c. One third will develop cystitis during pregnancy.
- d. One third will develop acute pyelonephritis during pregnancy.
5. How is asymptomatic bacteriuria diagnosed?
 - a. By detecting proteinuria.
 - b. By testing for nitrites and leucocytes in the urine.
 - c. By examining a sample of urine under the microscope.
 - d. By culturing a sample of midstream urine.
6. Which clinical sign suggests that the patient has acute pyelonephritis?
 - a. Tenderness over the bladder.
 - b. Oedema.
 - c. Severe tenderness to percussion over one or both renal angles.
 - d. Severe tenderness in the upper abdomen.
7. What is the correct management of a patient with acute pyelonephritis?
 - a. Amoxicillin (Amoxil) 3 g as a single oral dose.
 - b. Amoxicillin (Amoxil) 500 mg 8 hourly by mouth for 7 days as an outpatient.

- c. The patient must be admitted to hospital and receive amoxicillin (Amoxil) 500 mg 8 hourly by mouth for 7 days.
 - d. The patient must be admitted to hospital and receive an intravenous broad-spectrum antibiotic.
8. What is the definition of anaemia in pregnancy?
- a. A haemoglobin concentration of less than 12 g/dl.
 - b. A haemoglobin concentration of less than 11 g/dl.
 - c. A haemoglobin concentration of less than 10 g/dl.
 - d. Any patient with shortness of breath irrespective of the haemoglobin concentration.
9. What is the commonest cause of anaemia in pregnancy?
- a. Iron deficiency.
 - b. Folic acid deficiency.
 - c. Infection.
 - d. Blood loss.
10. The management of anaemia in pregnancy depends on:
- a. The presence or absence of oedema.
 - b. Whether the patient is pale or not.
 - c. The presence or absence of shortness of breath and tachycardia.
 - d. The presence or absence of hypotension.
11. What should be the management of an anaemic patient if the haemoglobin concentration is less than 8 g/dl and the gestational age 37 weeks?
- a. Admit to hospital for bed rest and a good diet.
 - b. Admit to hospital for a blood transfusion.
 - c. Give an intramuscular injection of iron-dextran (Imferon).
 - d. Prescribe one ferrous sulphate tablet 3 times a day until delivery.
12. What should be the management of a patient in the puerperium who has normal observations and has no bleeding, but has a haemoglobin concentration of 9 g/dl?
- a. Reassure her that no treatment is needed.
 - b. Give her a blood transfusion.
 - c. Advise her to eat a good diet.
 - d. Prescribe an oral iron supplement.
13. Which patients should receive supplementary iron during pregnancy?
- a. All patients.
 - b. Only patients with a haemoglobin concentration of less than 10 g/dl.
 - c. Only patients with a full blood count suggesting iron deficiency.
 - d. Patients from communities where iron deficiency is common or socio-economic circumstances are poor.

14. What should be done if a patient has side effects from the iron supplementation?
 - a. She should be reassured and the importance of taking the iron tablets should be stressed.
 - b. The tablets should be taken with meals.
 - c. The iron tablets should be stopped.
 - d. The iron tablets should be stopped and metoclopramide (Maxolon) given.
15. A patient with asymptomatic heart valve disease:
 - a. Must be admitted to hospital for bed rest from 34 weeks gestation.
 - b. Must be delivered in hospital because of the high risk of pulmonary oedema during labour and the first day of the puerperium.
 - c. Should be classified as low risk and delivered in a primary perinatal care clinic.
 - d. Should be given Syntometrine after delivery to prevent a postpartum haemorrhage.
16. Which complication is common in diabetics in the third trimester?
 - a. Anaemia.
 - b. Pre-eclampsia.
 - c. Oligohydramnios.
 - d. Pulmonary oedema.
17. Which complication is common in the second stage of labour in patients with poorly controlled diabetes?
 - a. Precipitous (sudden, unexpected) delivery.
 - b. Impacted shoulders.
 - c. Hypoglycaemia.
 - d. Hyperglycaemia.
18. A random blood glucose concentration should be done when:
 - a. 1+ ketonuria is detected for the first time in pregnancy.
 - b. 1+ glucosuria is detected for the first time in pregnancy.
 - c. Patients attend their first antenatal care clinic.
 - d. Patients attend their second antenatal care clinic.
19. Which random blood glucose concentration is normal?
 - a. Less than 4 mmol/l.
 - b. Less than 6 mmol/l.
 - c. Less than 8 mmol/l.
 - d. Less than 11 mmol/l.
20. Which fasting blood sugar measurement is normal?
 - a. Less than 4 mmol/l.
 - b. Less than 6 mmol/l.
 - c. Less than 8 mmol/l.
 - d. Less than 11 mmol/l.

Answers

After each answer, the number indicates from where the questions were taken. For each question that you answer incorrectly, please re-learn the corresponding section.

16. c (1-36)

17. b (1-38)

18. b (1-41)

19. d (1-46)

20. c (1-51)

Test 1: Antenatal care

1. c (1-3)

2. b (1-6)

3. d (1-8)

4. c (1-8)

5. a (1-9)

6. b (1-10)

7. c (1-22)

8. c (1-24)

9. d (1-24)

10. a (1-24)

11. a (1-25)

12. b (1-27)

13. b (1-30)

14. d (1-30)

15. c (1-36)

Test 2: Assessment of fetal growth and condition during pregnancy

1. b (2-2)

2. d (2-5)

3. b (2-5)

4. b (2-7)

5. c (2-8)

6. b (2-9)

7. c (2-10)

8. a (2-11)

9. d (2-12)

10. d (2-13)

11. b (2-14)

12. d (2-17)

13. c (2-18)

14. c (2-18) 13. c (3-22)
15. a (2-20) 14. d (3-23)
16. a (2-21) 15. d (3-24)
17. b (2-21) 16. b (3-24)
18. d (2-23) 17. c (3-26)
19. b (2-24) 18. a (3-26)
20. c (2-25) 19. c (3-28)
 20. b (3-33)

Test 3: Hypertensive disorders of pregnancy

1. b (3-2)
2. b (3-3)
3. c (3-4)
4. a (3-6)
5. c (3-9)
6. d (3-14)
7. a (3-14)
8. a (3-15)
9. b (3-15)
10. c (3-16)
11. a (3-18)
12. b (3-18)

Test 4: Antepartum haemorrhage

1. c (4-1)
2. d (4-2)
3. a (4-5)
4. d (4-6)
5. a (4-8)
6. c (4-8)
7. a (4-9)
8. d (4-12)
9. a (4-14)
10. a (4-16)
11. b (4-16)

12. b (4-18) 10. c (5-12)
13. a (4-19) 11. d (5-14)
14. c (4-20) 12. a (5-16)
15. b (4-21) 13. c (5-17)
16. a (4-24) 14. b (5-18)
17. c (4-28) 15. c (5-20)
18. b (4-29) 16. a (5-21)
19. a (4-30) 17. a (5-23)
20. d (4-31) 18. b (5-23)

**Test 5: Preterm labour and
preterm rupture of the
membranes**

1. c (5-1)
2. c (5-2)
3. d (5-5)
4. b (5-7)
5. c (5-7)
6. a (5-8)
7. c (5-8)
8. c (5-10)
9. a (5-11)
1. d (6-4)
2. b (6-4)
3. d (6-4)
4. c (6-6)
5. c (6-21)
6. a (6-25)
7. d (6-28)
8. c (6-33)

**Test 6: The puerperium and
family planning**

9. b (6-35) 4. d (7-6)
10. a (6-42) 5. d (7-7)
11. b (6-43) 6. c (7-10)
12. a (6-47) 7. d (7-12)
13. c (6-49) 8. b (7-15)
14. a (6-50) 9. a (7-17)
15. d (6-52) 10. c (7-18)
16. d (6-52) 11. b (7-18)
17. d (6-52) 12. d (7-18)
18. b (6-53) 13. d (7-19)
19. d (6-54) 14. b (7-22)
20. c (6-56) 15. b (7-25)

**Test 7: Medical problems
during pregnancy and the
puerperium**

1. c (7-3) 16. b (7-28)
2. b (7-4) 17. b (7-28)
3. a (7-5) 18. b (7-30)
19. c (7-33)
20. b (7-34)