Antenatal and Postnatal Care

A Manual for Healthcare Providers

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CENTRE FOR MATERNAL AND NEWBORN HEALTH

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Introduction

Maternal and perinatal mortality is still unacceptably high in many low- and middle-income settings. An estimated 303,000 women died in 2015 due to complications during pregnancy and childbirth. In addition, there were 2.7 million newborn deaths three quarters of which occur in the first week of life, and, an estimated 2.6 million stillbirths.[1] Neonatal deaths account for almost half of all deaths in children under five years of age. Most of these deaths could have been prevented if effective care had been available and of good quality.

The burden of pregnancy related morbidity is largely unknown but likely to be significant. For every maternal death, an estimated 20 to 30 women experience significant morbidity requiring healthcare. Preliminary studies show that during and after pregnancy, 3 out of 4 women have clinical symptoms, abnormalities on clinical examination and/or laboratory investigation, 1 in 2 women have anaemia, 1 in 3 social morbidity and 1 in 4 mental health problems.[2]

Since the Millennium Declaration in 2000, there have been reductions in both maternal and neonatal mortality, largely because of interventions that have been put in place around the time of birth. This has resulted in an increased uptake of skilled birth attendance or facility delivery from 56% globally in 1990 to 74% estimated in 2015.[1] Effective interventions during the time of childbirth and the period immediately after birth are particularly critical to reduce maternal deaths, stillbirths and early neonatal deaths. Ensuring that health needs are identified and met during and after pregnancy is equally important.

The scope of the international health targets has been expanded moving from a focus on preventing death to formulating targets for and emphasising the importance of health and well-being. The United Nations Global Sustainable Development Goal, (SDG), for health is to 'Ensure healthy lives and promote well-being for all at all ages'. Similarly, the Global Strategy for Maternal Newborn and Child health emphasises that all women have the right to the highest attainable standard of health and well-being including the physical, mental and social aspects of health.

Of the 50 essential interventions for reproductive, maternal, newborn and child health for which there is evidence of effectiveness and which can be expected to have a significant impact on maternal, newborn and child survival; more than half are expected to be implemented as part of a continuum of care during and after pregnancy.[3] It is important to ensure antenatal and postnatal care are integrated i.e. inclusive of the recognition and management of malaria, HIV/AIDS and tuberculosis as well as the provision of 'routine' obstetric care. In addition, it is important that care is differentiated i.e. meeting the specific identified health needs of each mother and her baby.

[1] WHO (2016) World Health Statistics 2016: Monitoring Health for the Sustainable Development Goals SDGs. Geneva: World Health Organization.
[2] Based on a study conducted by CMNH in 2015 among 11,454 women in Kenya, Malawi, Pakistan and India.
[3] WHO, Aga Khan University (2011) Essential Interventions, Commodities and Guidelines for Reproductive, Maternal, Newborn and Child Health: A global review of the key interventions related to Reproductive, Maternal, Newborn and Child Health (RMNCH). Geneva, Switzerland PMNCH.

Globally, 83% of women attend for antenatal care on at least one occasion during pregnancy and 64% attend four times or more.[4] In reality, in many cases this constitutes a series of 'missed opportunities'. Only 48% of women and babies globally receive postnatal care.[1]

Good care during and after pregnancy is important for the health of both the mother and the baby.

During antenatal care, conditions that may lead to complications of childbirth, maternal mortality, stillbirth and neonatal death can be prevented, identified and managed. Antenatal care links the woman and her family with the formal health system, has the potential to improve health during pregnancy for both the mother and her unborn baby, increase the probability of the mother receiving skilled birth attendance, essential newborn care and postnatal care.

Care in the period following birth is critical not only for survival, but, also for the future health and development of both the mother and her baby. An important challenge in the postpartum period is providing support for family planning to address a largely unmet need for contraception that can prevent unintended, untimely and unwanted pregnancies.

This manual is structured around the leading causes of ill-health in the mother during and after pregnancy and in the newborn baby. It sets out how antenatal and postnatal care can be organised such that it is comprehensive, integrated and differentiated. Mothers and babies will then receive the care they need, when they need it, and, in a way that is user-friendly, ensuring that both the mother and baby survive and thrive during and after pregnancy.

The guidance in this manual is based upon the latest available scientific evidence. Given that evidence-based medicine is the standard on which to base clinical practice, the manual will be updated as new information becomes available.

This manual is meant for use by all those healthcare providers – nurses, midwives, clinical officers, medical assistants and doctors – working in low- and middle- income countries in sometimes very difficult situations, striving to provide good quality of care. We sincerely applaud them and their work and hope they will find this manual useful.

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[4] WHO (2015) World Health Statistics 2015. Geneva: World Health Organization. Available from: http://www.who.int/gho/publications/world_health_statistics/2015/en/

Chapter 1: Quality of antenatal and postnatal care

In this chapter, you will find information about:

- Quality of care
- Respectful maternity care
- The rights-based approach to health
- Communication skills
- How and when to obtain informed consent
- The importance of male involvement and companionship

The quality of care

Internationally, there has been much progress made with regard to increasing the coverage of maternal and newborn health interventions over the past two decades. However, further improvement in maternal and newborn health outcomes will depend on the ability of healthcare leaders and providers to address the gap between availability and quality of care. Improving the quality of facility-based healthcare services and prioritising quality improvement as an integral component of scaling-up of effective, evidence-based interventions is crucial if health outcomes for women and babies are to improve.

There are many definitions of quality of care, all of which are important for antenatal and postnatal care.

Definitions of quality of care

- Quality of care is defined as the extent to which health services provided to individuals and populations improve desired health outcomes. In order to achieve this, health care needs to be safe, effective, timely, efficient, equitable, and people-centred.
- Quality of care is the degree to which maternal health services increase the likelihood of timely and appropriate treatment for the purpose of achieving desired outcomes that are both consistent with current professional knowledge and uphold basic reproductive rights.
- The quality of medical care is an index of civilisation.

Multi-disciplinary teamwork with midwives, nurses and doctors is essential to provide good quality evidence-based care. Sometimes, healthcare providers may provide care which is not proven to be effective (i.e. non-evidence-based) simply because “that is the way it has always been done”. Therefore, it is important that all healthcare providers are knowledgeable and keep up-to-date regarding which aspects of care are evidence-based and beneficial and, conversely, which aspects of care are detrimental and for which there is no evidence of benefit to either the woman or her baby.

Components of good quality care

- Care is provided in line with current available evidence (evidence-based care)
- Care that is supportive, responsive and sensitive to the values and context of each woman's culture.
- Each woman is welcomed and called by her name.
- Special attention is given to each woman's specific needs and wishes.
- Each woman's physical, social and mental health needs are taken into account.
- Each woman is treated with compassion, kindness, and patience.
- Women are given information in plain language and play an active role in the decision-making process for the care they receive. Privacy and confidentiality is maintained at all times.
- Women are given the opportunity to ask questions, and to have their concerns addressed.
- The woman's partner of choice is consulted, involved and informed of decisions, interventions and needs as they arise, with the woman's permission.
- A mother and her newborn are enabled to remain together from birth and throughout their stay in or visit to a healthcare facility.

Respectful maternity care

Respectful maternity care is an essential part of quality improvement. This includes care that is woman-centred, empowering, supportive, evidence-based, enabling open communication and full expression of trust and commitment between a woman and her healthcare provider. Respectful maternity care highlights that women have a right to receive the highest quality of care possible, in a way that addresses their physical, psychological and social needs. Treating women with dignity and respect means that the healthcare provider has a caring attitude, listens to women, respects their wishes and demonstrates empathy.

- **Respect:** This can be a certain feeling or holding someone in high regard, having respect for someone's knowledge, their judgement or hard they work. The healthcare provider can show respect by introducing her/himself by name and greeting the woman by her name.

- **Empathy:** Showing empathy for someone means understanding their situation, thinking how you would feel if you were in a similar situation and being able to share their feelings. The healthcare provider can show empathy by active listening to understand a woman's specific health concerns. Having sympathy is slightly different and involves showing compassion or sorrow for someone's problem or hardship.

- **Dignity:** Showing dignity means that a woman is valued and care is given in a way that supports and promotes, and does not undermine, a woman's self-respect regardless of any difference. The healthcare provider can demonstrate dignity by ensuring privacy and confidentiality at all times.

To provide respectful maternity care, healthcare providers need to have the right attitude, beliefs and values. An attitude is how we evaluate a person, place, thing or event, and may be favourable or unfavourable. A belief is a thought that we hold deeply and trust and, because of this, this can cause automatic reactions in us. People do not often question beliefs as they hold them to be true. Attitudes and values are shaped by our beliefs and we may not always be aware of these unless we stop to think about them. Everyone has a right to their own beliefs but when caring for

women, healthcare providers may have to explore and understand how these affect the care they give (both positively and negatively).

These are reasons that may explain why disrespect and abuse during antenatal and postnatal care occurs and a review of these may help healthcare providers work out ways to resolve the issues. Sometimes there are factors in the health system itself or in the community that act as barriers to being able to provide good quality care. Healthcare providers and managers can usually influence these factors to help facilitate improvement and overcome these barriers.

Table 1.1 Barriers and enabling factors for delivery of respectful maternity care

	Barriers	**Enabling factors**
Health system factors	Inadequate infrastructure	Reorganisation of available space, raise funds for seating
	Shortage of equipment and supplies	Regularly check stock and report any shortages to management regularly and early
	Poor supervision and management of healthcare facilities	Start a system of peer support
	Poor resource management of existing staff	Make a clear rota and schedule for clinics
	Inadequate communication linkages between healthcare facility managers, providers and community members	Organise quality of care meetings
Community level factors	Gender imbalances in communities where the man is the sole decision maker	Ensure discussions with both female and male community leaders
	Lack of knowledge about the importance of maternity care	Community education
	Financial barriers including the need to pay for transport to access care	Mobilise community resources
	Limited opportunities for communities to seek redress if women are unhappy with services received	Encourage the community and women to give feedback about the quality of care they have received, both positive or negative experiences
	Traditional beliefs, practices, customs and taboos making it difficult to discuss issues around childbirth	Respect tradition and deliver care in ways that are culturally appropriate

The rights-based approach to reproductive health

The definition of reproductive health highlights the importance of a rights-based approach to health care. Reproductive health is the complete physical, mental and social well-being in all things related to the reproductive system, including a satisfying sex life, the ability to have children and freedom to decide if when and how often to have children.

Reproductive rights include the right to:

- Decide how many children they want and the spacing of their children
- Have an education about and the means to choose the contraception method of their choice
- Have the highest possible standards of reproductive health
- Access to a skilled birth attendant
- Make decisions about reproduction free from discrimination, coercion and violence

Not treating a woman with respect and dignity when providing health care is a violation of their rights as a human being. Examples of abuse of human rights in maternal health are:

- **Physical abuse**: a woman is slapped during childbirth by the healthcare provider.
- **Non-consensual care**: care is provided without the woman's permission and/or agreement, for example performing routine episiotomy, especially without analgesia.
- **Non-confidential care**: test results for a woman are shared with others without her permission.
- **Discrimination**: women who are illiterate are not treated with the same regard as educated women.
- **Abandonment or withholding of care**: a woman who needs care is not given this care by the healthcare provider for example analgesia is not offered during and after childbirth.

Table 1.2 The rights-based approach to reproductive health

	Examples of rights	Example of disrespect and abuse	Example of how rights can be met
1	Freedom from harm and ill treatment	Physical or verbal abuse	Ensure a policy of no physical or verbal abuse is implemented
2	Right to information, informed consent and refusal of care	Non-consensual care	A clear explanation is given to women about the care they need and why. They are not penalised if they refuse the care offered to them
3	Respect for choices and preferences for care, including having a companion during maternity care	No companion allowed in the examination room during antenatal or postnatal care	Healthcare providers allow the companion of the woman's choice to be with the woman at all times
4	Confidentiality, privacy	Non-confidential care	Healthcare provider speaks with the woman on her own when needed
5	Equality, equitable care, freedom from discrimination	Discrimination based upon specific characteristics of the woman	All women are treated the same
6	Right to timely health care and to the highest standard of care available	Abandonment or denial of care or poor quality of care	Good organisation of antenatal and postnatal care to reduce waiting time. Evidence-based, timely care is provided safely
7	Liberty, autonomy, self-determination and freedom from coercion	Detention in a healthcare facility against a woman's wishes	Explanations given regularly as to why a woman needs to stay in a healthcare facility. Process for self-discharge against medical advice in place

Communication skills

Good communication skills, both verbal and non-verbal, are essential for all healthcare providers. Any interaction between healthcare providers and a woman and her family is an opportunity to build rapport and demonstrate respectful care. The experience of the visit and consultation is likely to affect how the women and her family perceive the care they receive and this will influence their decision to continue coming to the healthcare facility.

Effective communication includes:

- Having the ability to listen to the woman and her family
- Being able to explain what the care is, what investigations are being offered and the meaning of the results of the test in words that the woman will understand
- Using the local language that a woman understands, an interpreter may be needed
- Demonstrating empathy for the women and her family
- Being non-judgemental

Ways to improve communication:

- Allow some time for introductions explaining who you are and what you plan to do
- Sit at the same level as the woman when you are talking with her when taking a history
- Sit beside a woman rather than behind a table or desk during consultation
- Use language that is not medicalised and can be understood by the woman and her family
- Provide a private space for the discussion to happen whenever possible

Informed consent

Giving consent in maternal health for treatment is based upon the principle that a woman must give their permission before medical treatment, a test, a medical procedure or an examination is carried out. Consent can only be given after a clear explanation is given by a healthcare provider and understood by the woman.

Consent needs to be:

- **Voluntary**: The decision must be made by a woman without influence or coercion from healthcare providers, friends or family.
- **Informed**: A woman must be given correct information about what the treatment or examination involves, including the benefits and risks, reasonable alternatives and what will happen if the treatment or examination goes ahead, all in plain language.

In principal, a woman must be capable of giving consent, which means they can understand the information that has been given to them and can use it to make an informed choice. Consent can be verbal, such as when taking a blood sample or written such as required in the case of a Caesarean section.

Different forms of consent

- **Lack of consent**: Obtaining voluntary and informed consent can be difficult if a woman has an impaired state of mind or is unconscious, such as after an eclamptic fit. In such cases the partner or family member can be asked to provide consent for treatment.
- **Refusal of care**: Even if refusing treatment might cause harm or death, a woman's decision should be respected within the laws of the country. This can be very difficult, for example, when a woman with a very low haemoglobin level refuses a blood transfusion for religious reasons. In these cases, a woman can be asked to sign a form or statement which declares that she understands the risks of going against medical advice and still wishes to decline treatment, accepting responsibility for any risks to her own health. If a woman is pregnant and a refusal of care (e.g. the need for a Caesarean section) will result in harm to the unborn baby then a legal judgement may have to be made for the treatment to go ahead.
- **Age**: In the case of a woman who is under the legal age of consent then she may still be able to give consent if she can demonstrate to the healthcare provider that she fully understands what she is consenting to. If this is not the case, then parents or guardians may have to give consent. Laws regarding consent vary from country to country. In most countries, the age of consent is either 16 or 18 years of age.

In practical terms, it may not be possible to obtain written consent in emergency situations, for example, a massive obstetric haemorrhage and in these cases a healthcare provider can proceed with verbal consent prior to treatment.

Male involvement and companionship

In some settings, pregnancy is considered a subject/topic for women and men may not be equipped with sufficient information and knowledge on specific aspects of maternal and newborn health. There is therefore, a need to empower men through the provision of information and services in their homes, communities and their workplaces. It is important to involve the woman's husband or partner and family whenever possible so that they are well informed about the care that the woman needs. This will enable them to anticipate any problems and support the woman during and after pregnancy and childbirth.

Advantages of involving the husband/partner and family include:

- Increased information regarding the pregnancy, childbirth and postnatal processes
- Increased awareness of possible danger signs during the pregnancy
- Development of a birth plan including availability of finances and planning for transport to the healthcare facility
- Increased understanding of the specific needs of the mother and baby when returning to the family home
- Increase in general community and public awareness of issues around maternal and newborn care

Support from a husband, partner, another family member or friend is important during pregnancy, labour, birth and the postpartum period. Women can be encouraged to bring their husband or partner during antenatal care, delivery and postnatal care as it is important that the husband or partner understand the woman's health. Men are more supportive to their wives and partners

when they understand what is happening during and after pregnancy. Male involvement and participation is associated with improved maternal health outcomes.

In the absence of a husband or partner and/or if this considered culturally more appropriate, women can be encouraged to bring a family member or friend with them. A companion can provide important support to a woman. Companionship during labour leads to a better birth experience for the woman.

Chapter 2: Organisation of antenatal and postnatal care

In this chapter, you will find information about:

- The different models of antenatal and postnatal care
- Preparing the healthcare facility for antenatal and postnatal care
- Essential equipment and supplies for antenatal and postnatal care
- Infection prevention and control
- Ensuring a clean, safe working environment
- Community involvement in antenatal and postnatal care

Models of antenatal and postnatal care

Antenatal care

The traditional antenatal care model

The traditional antenatal care model was developed in the 1900s. The aim was to provide between 16-18 visits during pregnancy for women. Using an 'at risk' identification approach, women were classified as either high- or low-risk patients. The aim of this type of antenatal care was to try and predict complications that might occur and prevent and manage these.

When taking a women's history, a healthcare provider can identify risk factors that could lead to complications during pregnancy, labour, birth or in the postnatal period. Risk factors will depend on the woman's age; how many previous pregnancies she has had; if she has had miscarriages, stillbirth or preterm birth in the past; if she has current co-existing illnesses such as malaria, HIV, tuberculosis (TB), anaemia or diabetes. However, many complications during and after pregnancy can also be unpredictable and unexpected.

The focused antenatal care model

In 2001, the World Health Organization (WHO) recommended a model of antenatal care called focused antenatal care to replace the traditional antenatal care model. This used a goal-orientated approach that focused on the quality of the visits rather than the number of visits. The number of recommended visits was reduced from sixteen to four. This approach aimed to provide individualised care and promote the health of mothers and their babies through targeted assessments.

These targeted assessments include the following:

- Identify and treat illnesses
- Detect obstetric complications early that could affect the outcome of pregnancy
- Provide preventive and care management (e.g. screening for and management of hypertension and pre-eclampsia, detection and treatment of anaemia, identification of women with multiple pregnancy)
- Provide prophylaxis and treatment for anaemia

- Screen and treat for infections including HIV, TB, malaria.
- To prevent neonatal tetanus in the baby by vaccination of women during pregnancy

Individualised care for the woman aims to help maintain the normal progress of pregnancy through advice and guidance, and includes:

- Birth preparedness, planning a birth plan along with husband/partner and family
- Education regarding nutrition, immunisation, personal hygiene, immediate and exclusive breastfeeding, essential newborn care and family planning
- Counselling on danger signs so that the woman can recognize them and get immediate help from a healthcare provider

Most low and middle-income countries (LMIC) have implemented the model of focussed antenatal care. In 2016, new guidelines from the World Health Organization were released which recommend that the number of antenatal visits be increased from four to eight. This is because it is thought that increasing the number of antenatal visits may reduce the likelihood of stillbirth and perinatal death due to increased opportunities to detect and manage potential problems. The implementation of this recommendation will depend on the health system infrastructure in each setting.

Postnatal care

Timing and number of postnatal visits
In 2016, new guidelines from the World Health Organization recommend that:

- If birth is in a healthcare facility, mothers and newborns should receive postnatal care in the facility for at least 24 hours after birth.
- If birth is at home, the first postnatal care visit from a healthcare provider should be as early as possible within 24 hours of birth.
- At least three additional postnatal visits are recommended for all mothers and newborns
  - Day 3 (within 48-72 hours)
  - Day 7-14 after birth
  - 6 weeks after birth

Home visits in the first week after birth are recommended for care of the mother and newborn. In some settings, these home visits can be supported by the community health workers. This may allow more time for health education and help ensure that recommendations made during antenatal and postnatal visits are well understood and implemented. In general, however, community health workers may not have the capacity to deliver the full content of evidence-based antenatal and postnatal care packages and will need support from healthcare providers.

Maternity waiting homes

If a healthcare facility is far from a woman's home, it is beneficial for the woman to have access to a maternity waiting home. Maternity waiting homes are residential facilities, located near to a healthcare facility, where women can await the onset of labour and childbirth with easy access to skilled attendance at birth.

Preparing the healthcare facility for antenatal and postnatal clinics

Group or individualised antenatal and postnatal care

Individualised antenatal care is when each woman has an allocated, timed one-to-one appointment. In general, this means she will spend less time in the healthcare facility and there are shorter waiting times. However, there is less group interaction between women attending for care.

Group antenatal care is when care is provided to a group of women. Often, this means women are first registered one-by-one, the blood pressure is measured for each woman and other investigations may be done. After this, each woman may see a healthcare provider for abdominal palpation in turn. This allows for group interaction but it can be very time inefficient and care is often fragmented i.e. a woman sees several different healthcare providers each time.

Women may attend for antenatal care by themselves, with their husband/partner, family member or friends. Waiting times in clinics may be long and although it is important that this is resolved, this time could be used to provide health education to women, to answer any questions women may have and establish communication, confidence and trust in the health system. Being part of a group may empower women to ask more questions and woman may find it helpful to share their experiences with other women.

Preparing the antenatal and postnatal clinic area

Ideally, the location in the healthcare facility where the antenatal and postnatal clinics take place should be welcoming and appropriate for providing both individual care (history taking, counselling, physical examination and provision of care) and collective support (health education, birth preparedness activities). As well as consultation areas, there should also be a waiting area with seats for women and their husbands/partners and a separate toilet. The exact layout of the antenatal and postnatal clinic will vary depending on the level of care it provides: tertiary, secondary or primary care level. In smaller healthcare facilities, space may be limited, there may be only one room and so the room may have multiple uses. In this case, areas can be screened off for performing examinations and to maintain privacy. A suggested layout is presented in Appendix 1 and a suggested enabling environment includes the following:

Cleanliness, comfort and order of the clinic area

- Area is clean and free from clutter
- Enough space (examination room/area and waiting rooms/area identified)
- Well maintained building
- Essential equipment is available and ready for use
- Separate containers for clinical waste (for contaminated materials) and non-clinical waste available chlorine solution (0.5%) and cleaning materials to clean working surfaces
- Broom for sweeping

Furniture

- Examination couch or bed and steps to get onto the couch or bed
- Seating for the women and her companion(s)
- A table or desk and chair for the healthcare provider to write
- A table or trolley for supplies
- Screens for privacy
- Cupboard which can be locked for medical records, registers, drugs, consumables and supplies
- A dedicated area with a table and chairs where blood and urine testing can be performed

Water supply

- Clean running water available from a tap, pump or poured from a basin or container for handwashing and drinking water for women

Light source

- Reliable source of light plus specific source of light to undertake pelvic examination, e.g. head torch, standing lamp (depending on power supply available)

Staffing

- The correct number and cadre of staff for the clinic and number of women expected

If no separate waiting room is available, then an area or shelter where women can wait protected from the sun or rain should be provided. Clean water is essential for any antenatal and postnatal clinic. If there is intermittent electricity supply, then good natural lighting is important. Maintaining privacy and confidentiality during the consultation and examination is very important. If there are a limited number of rooms, then screens should be used.

Essential equipment and supplies

When preparing the clinic for antenatal and postnatal care, a full set of equipment and supplies needs to be available. It is important to check this and organise the clinic area and room before the clinic starts.

- General supplies, e.g. furniture, stationery
- Medical equipment, e.g. blood pressure machine
- Equipment needed for taking blood and urine samples, equipment and supplies needed for Hb estimation malaria, syphilis, HIV testing, and urine testing)
- Essential drugs, e.g. anti-hypertensives, antibiotics.

Further suggestions for supplies for each of the above are provided in Table 2.1. These will vary depending on the specific needs of the healthcare facility and setting.

Table 2.1 Essential equipment and supplies needed for the antenatal and postnatal clinic area

Examination area	Drugs and supplies	Fixed assets	Test kits, reagents and consumables
Height scale and weighing scales	Multivitamins, iron and folic acid tablets	Wheelchair	Cuvettes and cleaner for Hemocue
Running water and soap or bucket of clean water	Tetanus toxoid injection	Hemocue machine (or another method of measuring Hb)	Batteries and control for Hemocue
Stainless steel tray, gallipot	Long-lasting insecticide-treated bed nets	Glucometer	HIV/Syphilis duo test
Handheld doppler or pinard stethoscope	Malaria prophylaxis (IPT)	Mobile GeneXpert IV machine (for diagnosing TB)	GeneXpert cartridge
Measuring tape	Anti-retrovirals	Steriliser	Malaria RDT kit
Antenatal wheel to calculate estimated date of delivery	Analgesia	Ultrasound scanning machine	Urine dipsticks, Urinary pregnancy tests
Blood pressure machine	Antibiotics	Fridge or cool box	Normal gloves and sterile gloves
Stethoscope	Anti-hypertensives		Tourniquet
Thermometer	**Office Stationery**		Syringes and needles
Metallic speculum	Antenatal care card or mother and baby booklet		Alcohol swabs
Patella tendon hammer	Registers and record books Information pamphlets, chart and wall posters		Urine and sputum containers

Infection prevention and control

Infection prevention and control is important to prevent infections from occurring and to prevent cross infection. Following the basic principles of infection prevention and control will help to protect both healthcare providers and women and their babies who access and receive care at the healthcare facility.

Handwashing

Good handwashing technique is the cornerstone of infection prevention and control. All healthcare providers should know how and when to wash their hands correctly. Ideally, hands should be washed with clean running water and liquid or clean soap (bars of soap may be reservoirs for microorganisms if left lying around for long periods of time). If running water from a tap is not available, then use a jug to pour water over hands. Hands should be dried with disposable paper towels or a clean cloth. Cloths that are used more than once can be a reservoir for microorganisms. Cloths and towels should be washed and dried regularly before re-use. Hands should be washed before and after examining a woman, taking blood, testing urine.

It is important for all healthcare providers to practice good hand hygiene. Each healthcare provider has a responsibility to help reduce the risk of infection in their work place and this can be done most effectively by washing hands correctly and following the correct handwashing procedures (Appendix 2). Alcohol hand rubs may also be used but they are not effective on hands that are visibly soiled; hands may still need to be washed prior to using alcohol hand rubs. Alcohol hand rub, where available, is useful as an alternative to handwashing between each woman.

Use of personal protective equipment

Personal protective equipment is equipment that is worn to help maintain health and safety and reduce the risk of infection. This includes gloves, aprons, masks and eye shields. Protective clothing is used to protect both the healthcare provider and woman from cross infection with microorganisms.

Gloves: Handwashing is still needed before and after putting on gloves. Any cuts or abrasions should be covered with a waterproof plaster. Gloves should always be disposable and never reused.

Table 2.2 Instructions for glove use

No gloves needed	Non-sterile gloves used	Sterile gloves used
■ Clinical observations, taking pulse, temperature, blood pressure ■ Abdominal palpation	■ Giving an injection	■ Changing wound dressing e.g. after Caesarean section ■ Removing stitches e.g. after Caesarean section ■ Inserting an intrauterine contraceptive device

Aprons, face masks and goggles: in situations where there is a greater risk of contact with potentially infected/contaminated body fluids, then aprons, face masks and goggles may need to be worn, in accordance with local protocols. The apron should cover all the front of the healthcare provider. Ideally, disposable aprons are used. Where there are no disposable aprons available, use

plastic or washable aprons which can be chemically cleaned with chlorine. Masks are usually disposable and googles can be disinfected.

Handling of sharps

Needles, finger prick scalpels and other sharp clinical waste need to be disposed of correctly to reduce the risk of injury to the woman and to the healthcare provider. The risk of infection depends on: if the instrument has been used, if it contains blood, how much infected material has entered the blood stream and how infective the material is.

To safely manage sharps:

- Always dispose of sharps in a rigid container that has a secure lid and is labelled appropriately
- Never overfill a sharps container
- Always assume discarded needles are infectious
- Never re-sheath a needle, even if it has not been used
- Be alert to the possibility of needles being present before handling waste e.g. when sweeping the floor and emptying bins

If a needle-stick or sharp injury does occur:

- Encourage the wound to bleed, ideally holding it under running water
- Wash the wound using running water and soap, but do not scrub it
- Dry and cover the wound
- Seek immediate medical advice regarding the need for immunisation for hepatitis B; post exposure prophylaxis to reduce the risk of HIV infection; treatment for general wound infections.

Ensuring a clean, safe working environment

[!] Ensure guidelines are in place for cleaning all areas of the clinic.

Cleaning the healthcare facility

It is important to routinely clean surfaces and to ensure that the healthcare facility environment is visibly clean and free from dust and soil.

Disinfection

Disinfection with chlorine is the most widely accepted and appropriate way of removing microbes. Sources of chlorine include bleaching powder, liquid bleach and chlorine tablets.

Cleaning schedule

A healthcare facility generally has three types of areas each with a specific cleaning routine.

- Sweeping: Offices, at least once a day
- Wet mopping: Waiting area, consulting room and area, general wards (non-infectious diseases), pharmacy at least once a day.
- Cleaning with a disinfectant (0.2% chlorine solution): All areas that have come into contact with women e.g. beds, seating, examination, cubicles, and weighing scales.

- Toilets should be cleaned whenever they are dirty but at least twice a day with a disinfectant used on all exposed surfaces and a brush to remove visible soiling (2% active chlorine solution).
- All horizontal surfaces are cleaned at least once a day and wherever they are soiled.
- Any areas contaminated with blood or other body fluids are cleaned and disinfected immediately (use chlorine solution 1%).
- Wet mopping with hot water and detergent is recommended rather than sweeping and cleaning of floors and other surfaces that are not in contact with hands.
- A 0.2% chlorine solution (or other suitable disinfectant) in cold or hot water should be used for surfaces that come in contact with people (hands) and for medical instruments.

Management of clinical waste

Clinical waste is any waste consisting wholly or partly of human tissue, blood or other body fluids, excretions, drugs or other pharmaceutical products, swabs or dressings, syringes, needles or other sharp instruments, which unless rendered safe, may be hazardous to any person coming into contact with it.

Correct disposal of clinical waste is important to stop cross contamination. Everyone who handles clinical waste is at risk of infection until it is safely disposed of. Some waste such as hand towels or wipes used to remove ultrasound gel may not be high risk but other products such as gloves, wound dressings or containers which have held blood will be very high risk. Clinical waste should be placed in a waterproof bag which is securely tied, sometimes these are colour coded so that it is easy to identify if the waste in the bag is high or low risk. If no coloured bags are available, use colour coded buckets, which are clearly labelled. Separate the clinical waste and non-clinical waste, this should be done from the point the waste is generated, during collection, transport and final disposal.

Disposal of waste materials

Waste may be burnt or buried if no incinerator is available. Ensure any burial pit is placed well away from any water supply which could then become contaminated and covered when not in use.

Table 2.3 Examples of colour coding of containers or bags for disposal of clinical waste

Yellow bags	Red bags	Blue bags	Black bags
- Infectious waste - Bandages - Gauze cotton or any other objects in contact with body fluids - Human body parts e.g. placenta	- Plastic waste such as catheters - Injection syringes - Tubing	- All types of glass and broken glass articles - Outdated and discarded medicines	Sharps container: - Needles without syringes blades - Sharps and all metal objects

There are four main categories of healthcare waste:

- **Sharps** (needles, scalpels) which may be infectious or not

Sharps should be placed in sharps container and regularly. Dispose of sharps in a sharps pit (buried drums in small facility, concrete-lined pit in other settings).

- **Non-sharps, infectious waste** (pathological waste, dressings, used syringes, used single-user gloves)

Dispose of in yellow or red bags or buckets with lids, collect and empty twice daily. Bury in a pit filled with a sealed cover and ventilation pipe for onsite treatment in small healthcare settings or high temperature incineration onsite or offsite.

- **Non-sharps non-infectious waste** (paper, packaging)

Dispose of in black waste containers which should be collected, emptied, cleaned and replaced once a day. Bury in a pit or incinerated with ashes and residues buried in a pit.

- **Hazardous waste** (expired drugs, laboratory reagents, radioactive waste, insecticides

Collect in appropriately labelled containers place in a secure location. There are several kinds of waste and each requires specific disposal methods.

[!] In all cases, local protocols should be followed.

Involving the community in antenatal and postnatal care

Community-based interventions for maternal and newborn health promote the involvement of communities in planning, implementation, and monitoring of activities in order to increase their access to quality health services in a dependable and sustainable manner. These interventions strengthen the capacities of pregnant women, community members, leaders, traditional care givers and other community healthcare workers to avoid practices that cause maternal and newborn ill-health, recognise danger signs and take prompt decisions in seeking appropriate care.

Community leaders can work with health service providers to plan the antenatal and postnatal care services that their community needs, advocate for change and support women through their pregnancy and beyond. If it is not possible to work with the whole community, working with certain groups or key individuals in the community may still help to improve antenatal and postnatal care, for example:

- Community leaders: e.g. political, religious or informal
- Community groups: e.g. women's groups, youth groups, income generating groups
- Community health volunteers
- Community healthcare providers

Community healthcare providers are particularly important in helping to ensure women access antenatal and postnatal care services. They are often well respected and well known within their community and are well respected by women. Community mobilisation refers to a larger scale movement to engage people's participation in achieving a specific goal through self-reliant efforts. This will include mobilisation of maternal and newborn health stakeholders, including men, policy-makers, training institutions, professional associations, non-governmental organisations, political and community and religious leaders, women's groups, business groups and industry, using social marketing and participatory methods. Advocacy is speaking up for, or acting on behalf of, yourself or another person. Advocacy at all levels is necessary to promote any community-based intervention.

Chapter 3: Antenatal care: first visit

In this chapter, you will find information about how to:

- Describe the rationale and principles of antenatal care
- Conduct a full comprehensive assessment of a pregnant women
- Demonstrate a positive attitude in caring for antenatal women
- Provide screening for psychosocial components of health
- Counsel pregnant mothers regarding complaints

Pregnancy and childbirth is a normal physiological process. However, some women may face life threatening conditions and complications during or after pregnancy. Antenatal care is one of the strategies to maintain maternal and fetal wellbeing and it is recommended that this is started early in pregnancy. As part of the continuum of care, antenatal care can improve the well-being of the pregnant woman as she approaches birth, by evaluating her health (using history taking, examination and investigations) and the provision of comprehensive prophylactic and therapeutic interventions as required. Globally, the vast majority of women access antenatal care at least once. However, often they do not receive good quality care in a way that meets their physical, psychological and social health needs.

Improve health and well-being

- Good quality antenatal care can identify complications of pregnancy that can adversely affect the woman and unborn baby, for example, pre-eclampsia and intrauterine growth restriction.
- Pre-existing medical conditions can become more severe during pregnancy and are associated with increased maternal and newborn complications.
- Domestic violence can often first occur and increase in frequency and severity for women during pregnancy. This is an underestimated global public health issue that is currently not routinely addressed in antenatal care.
- Rates of depression may be at least as high, if not higher, in late pregnancy as it is during the postnatal period. This is also an underestimated global public health issue that is currently not routinely addressed in antenatal care.

Health promotion, education and counselling

- Good care during pregnancy optimises the health of the woman and the developing baby.
- Pregnancy is a crucial time to promote healthy behaviours and parenting skills.
- Sharing information with the pregnant woman and her family enables the woman to make informed choices about pregnancy and birth.
- Antenatal care links the woman and her family with the formal health system. A positive antenatal care experience increases the chance of the woman using a skilled birth attendant at birth and/or accessing care in case of an emergency.
- Antenatal care provides the opportunity for clear plans to be developed in case of complications (emergency preparedness) and for the time of birth (birth preparedness).
- Antenatal care provides preventive measures e.g. folic acid and other nutritional supplements.
- Antenatal care provides the opportunity to recognise and deal with minor pregnancy associated problems and refer to appropriate higher levels of care if problems arise.

Antenatal care at booking visit

The earlier the first antenatal care visit the better, ideally in the first trimester (up to 12 weeks of gestation). Antenatal care is often the first time a woman accesses health care. Information is shared between the healthcare provider and the pregnant woman with the aim of discussing, planning and implementing care for the duration of the pregnancy, during delivery and the postnatal period, in a way that meets her needs.

General approach

- Introduction using respectful maternity care principles
- History taking
- Establish expected date of delivery
- Screen for psychosocial ill-health
- Clinical examination
- Investigations
- Provide treatment for any identified problems
- Health and nutrition education
- Immunisations e.g. tetanus booster
- Start preventative treatment for e.g. malaria, and ensure woman has a long-lasting insecticide-treated bed net if in a malaria-region
- Timing and plan for the next visits

Introduction using respectful maternity care (Chapter 1)

- All women have the right to the highest attainable standard of health and well-being including physical, mental and social components.
- Aim to provide the best quality and comprehensive care related to their gestation and available within your setting.
- Greet the woman in a friendly manner, offer her a seat, introduce yourself and ask the woman's name. All care must be non-judgemental.
- Ask the woman her reason for coming to the clinic and whether she would like her companion or other family member to be included in the discussion.
- Always gain verbal informed consent (explain what you are doing and why and ask the woman's permission) before undertaking any examination, tests or procedures. Written consent is required for invasive procedures.
- Explain the results and implications of all examinations and investigations performed.
- Ensure the woman's privacy and confidentiality.

Symptoms and signs of pregnancy

- One or more missed periods (this may not be noticed in a woman who is still breastfeeding or has been using injectable contraceptives recently)
- Nausea and vomiting
- Swollen and tender breasts
- Awareness of fetal movement 'quickening' (around 16-18 weeks' gestation in multiparous women, 20-22 weeks' gestation in primigravida women).

Investigations to confirm pregnancy include

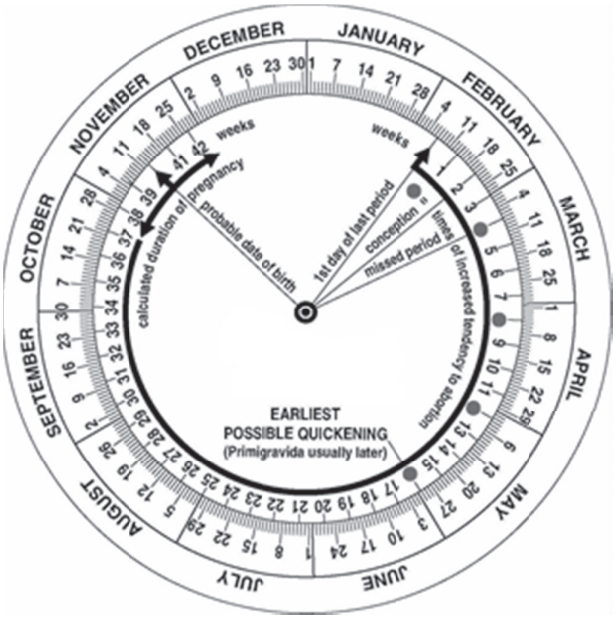
- Urine test: positive pregnancy urine test
- Blood test: positive beta-human chorionic gonadotrophin (βhCG) level on serology testing
- Identification of fetal heartbeat

Establishing gestational age and estimated date of delivery

- Using the date of the last menstrual period (LMP):
- Establish estimated gestation age
- Determine the estimated date of delivery (EDD) using the calendar method
- Calendar method: the date of the 1st day of the LMP + 7 days – 3 months = EDD
  For example: 10th April + 7 days = 17th April – 3 months = 17 January

A handheld pregnancy antenatal wheel can also be used to calculate estimated date delivery:

Figure 3.1: Example of a handheld pregnancy dating wheel



Ultrasound can be used to confirm the location of the pregnancy, to determine a single or multiple pregnancy, to determine the heart rate, to observe fetal movements and to measure the fetus to establish gestational age and estimated fetal weight.

In the first trimester, ultrasound scan can be used to date the pregnancy using crown rump length if the fetus is less than 12 weeks' gestation. Biparietal diameter is used to date the pregnancy if more than 12 weeks' gestation. If a growth assessment is required in the second or third trimester, a trained healthcare provider can use ultrasound to calculate an estimated fetal weight using biparietal diameter, head circumference, abdominal circumference, and femur length. In cases of concern where the growth of a developing baby needs to be monitored closely, serial growth scans would need to be performed and interpreted by a specially trained healthcare provider. Appendix 3 provides a summary of further uses of ultrasound during and after pregnancy.

History taking – obstetric

Table 3.1 Systematic antenatal obstetric assessment

Overview	Booking visit
Personal sociodemographic information	Name, address, age, contact details, occupation, education level, religion Relationship status (single, married, separated, widowed) Recent forms of contraception used History of cervical smears Last menstrual period
Past obstetric history	Details of all previous pregnancies, birth weights, gestational age at delivery, any previous obstetric complications, mode of delivery, previous miscarriages or termination of pregnancy **Complications in previous pregnancies:** ▪ Antepartum haemorrhage ▪ Pre-eclampsia or eclampsia ▪ Postpartum haemorrhage ▪ Previous blood transfusion ▪ Complications of episiotomy or vaginal and perineal tears ▪ Previous Caesarean section – document the reason to determine both recurrent (e.g. obstructed labour) and non-recurrent (placenta praevia) causes **Fetal/newborn complications in previous pregnancies** ▪ Low birth weight baby (<2.5kg) ▪ Preterm birth ▪ Big baby (>4.5kg) ▪ Congenital abnormalities ▪ Stillbirth ▪ Neonatal death

When taking a general history, ask the woman about any current or past illnesses she may have. A logical and systematic way to do this is to ask questions by organ system. Table 3.2 below lists common questions you can ask.

History taking – general

Table 3.2 Systematic antenatal general assessment

Organ system	Symptoms
Gastrointestinal	Vomiting (If yes, are you vomiting with blood?) Diarrhoea (If yes, is it bloody?) Weight loss Abdominal pain
Immunology	Fever, chills and rigours Lumps in the groin or armpit
Haematology	Feeling dizzy/faint or general tiredness Easily bruised

Cardio-pulmonary	Heart beating too fast (palpitations) Swollen fingers and hands, swollen legs Cough >2 weeks/<weeks, productive cough (sputum – yellow/blood) Shortness of breath at rest, chest pain, wheezing
Urinary	Increased frequency of passing urine Blood in the urine Leakage of urine with coughing, sneezing, laughing Leakage of urine all the time Pain during urination (dysuria)
Gynaecology	Abnormal vaginal discharge: malodourous or discoloured Vaginal bleeding (spontaneous or provoked) Post-coital bleeding (after sex) Genital ulceration or swelling
Dermatology	Skin rash Itchy skin Lumps Ulcers
Neurology	Seizures Visual disturbances Speech disturbances
Endocrine	Feeling cold Excessive thirst Awareness of polyuria (excessive urine)
Breasts	Nipple soreness/abnormal swelling in breast Pain in the breast Skin changes over the breast
Musculoskeletal	Back pain; arthralgia/arthritis (joint pains), especially pelvic girdle discomfort; unilateral calf swelling, leg pain or redness
Ear, Nose, Throat and Mouth	Sore throat Ulcers in the mouth
Current medication	For example: Antibiotics Anti-malarials Anti-retrovirals Antihypertensive treatment Haematinics for treatment of anaemia: iron, folate acid Medication for diabetes and asthma Analgesia
Psycho-social history	Screening tools for depression and domestic violence (Chapter 14 and Appendices 4, 5 & 6)

Clinical examination

During antenatal care, all women are offered full examination and routine investigations. It is very important that this is done completely and comprehensively at the booking visit.

Table 3.3 Systematic antenatal clinical assessment

Clinical observations	Height (cm) Weight (kg) Calculate Body Mass Index* (kg/m^2) Blood pressure (mmHg) Temperature (°C) (See Table 3.4 for normal parameters)
General Head-to-Toe Examination	General affect – anxious, depressed, in pain, content Conjunctival pallor Sclera (white part of eye) – jaundice Goitre Skin (Lumps/rashes/ulcers) Mouth (bleeding gums/ulcers/thrush) Pitting lower back/ankle oedema
Examination of the heart	Heart sounds Heart murmur Heart arrhythmia
Examination of the chest	Breathing – bilateral air entry Wheezing
Examination of the abdomen	Inspection: shape, size, type of scar and site, fetal movement Palpation: liver, fundal height, fundal palpation, tenderness, masses Auscultation: fetal heart rate
Examination of genitalia	Only examine the genitalia if clinically indicated

* Body mass index: this is the weight (measured) in kilograms divided by height (measured) in metres squared.

Table 3.4 Normal range of physiological observations

Physiological observations	**Normal ranges**
Blood pressure – systolic Blood pressure – diastolic	100-150mmHg 50-80
Respiratory rate	12-20 breaths per minute
Oxygen saturation	96-100%
Pulse	51-90 beats per minute
Temperature	36.1 -37.5°C
Neurological	Alert, orientated to time, person, place

Investigations

Table 3.5 Systematic antenatal investigations

Specimen	Test
Blood	Haemoglobin (e.g. using Hemocue) Malaria test (Rapid Diagnostic Testing) in endemic areas Syphilis (Rapid Diagnostic Testing) HIV (Rapid Diagnostic Testing) ABO blood group and Rhesus factor Hepatitis B Random glucose level (as per local protocols)
Urine	Glucose Protein Ketones Red blood cells Leucocytes Nitrites
Sputum (morning specimen)	In case of a productive cough >2 weeks and/or a woman who is HIV positive, offer sputum testing for tuberculosis (See Chapter 8: HIV, TB and Malaria in pregnancy)

[!] Complete the clinic record and the woman's antenatal care card. Ask her to bring her antenatal care card (handheld notes, if available) to all appointments in the healthcare facility.

Nutrition in pregnancy

Early in pregnancy, discuss the woman's diet and eating habits and find out and address any concerns she may have about her diet. Pregnant women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy balanced diet. Provide information on the benefits of a healthy diet and practical advice on how to eat healthily throughout pregnancy. This should be tailored to the woman's circumstances. Educate the woman on the importance of eating foods containing iron such as green leafy vegetables, meat, liver, beans. The advice should also include: eating five portions of fruit and vegetables a day and one portion of oily fish a week.

Supplements

Calcium

Dietary counselling of pregnant women should promote adequate calcium intake through locally available, calcium-rich foods if dietary calcium is low in the local population. Dividing the dose of calcium may improve acceptability. The suggested scheme for calcium supplementation is 1.5-2g daily, with the total dose divided into three doses, preferably taken at mealtimes.

Vitamin A

In populations where the prevalence of night blindness is 5% or higher in pregnant women should be advised to take vitamin A for a minimum of 12 weeks during pregnancy until delivery: 10,000 IU

vitamin A (daily dose) or 25,000 IU vitamin A (weekly dose) of oil-based preparation of retinyl palmitate or retinyl acetate.

Malnutrition in pregnancy is found among:
- Women from low socio-economic groups
- Widows or single women
- Women who have given birth to many babies, especially over a short period or if the last delivery was less than a year ago
- Women who are suffering from tuberculosis, HIV/AIDS and moderate-to-severe anaemia

If the woman is underweight and a supplementary feeding program is available in the health centre, provide food supplementation. If not available, refer to an appropriate service.

Prevention of tetanus

Protect all women giving birth and their newborn babies against tetanus by ensuring women are immunised against tetanus.

Table 3.6 Tetanus toxoid immunisation schedule for pregnant women

Dose	When to give	Protection
TT1	As early as possible during the current pregnancy	0%
TT2	At least 4 weeks after giving TT1, or at least 2 weeks before delivery	1-3 years (80%)
TT3	At least 6 months after giving TT2, or during the next pregnancy	5 years (95%)
TT4	At least 1 year after giving TT3, or during the next pregnancy	10 years (99%)
TT5	At least 1 year after giving TT4 or during the next pregnancy	For all childbearing years (99%)

Antenatal screening for medical and psychosocial conditions

- Screening for hypertensive disorders of pregnancy (Chapters 6 & 9).
- Screening for diabetes in pregnancy (Chapter 6).
- Screening for TB during pregnancy (Chapter 8).
- Screening for domestic violence (DV) (Chapter 14 and Appendix 6)

Birth and emergency preparedness

Antenatal care provides the opportunity for women and their husbands/partners and family to start to make a birth preparedness and complication readiness plan. At the time of the first visit at the healthcare facility, it is important that all of these things are discussed and a clear plan is developed in case of complications (emergency preparedness) and for the time of birth (birth preparedness).

This plan may include:

- Agreeing which healthcare facility, the woman will go to for the birth, preferably a well-staffed (midwife, doctor) and equipped facility, and what transport options are available.
- Ensuring that the woman and her family are aware and clear about any costs and money that may be required to pay for health care, and drugs that may be needed during the birth and or after delivery.
- Identification of the woman's blood group so the family can identify possible blood donors amongst family and friends.

Additional points

Practices that have been found not to be beneficial due to lack of evidence:

- Routine antenatal breast examination (only if clinically indicated)
- Routine antenatal pelvic examination (only if clinically indicated)
- Routine daily fetal movement counting. Instead inform the women: "If you notice your baby is moving less than usual or if you have noticed a change in the pattern of movements, it may be the first sign that your baby is unwell and therefore it is essential that you contact your healthcare provider immediately so that your baby's well-being can be assessed."

[!] Remember to complete the clinic record and the woman's antenatal care card.

[!] Ask the woman to bring her antenatal care card (and full handheld notes, if available) to all appointments in a healthcare facility.

Prevention and treatment of common conditions in pregnancy

Anaemia in pregnancy (Chapter 6)

Interventions aimed at preventing iron deficiency in pregnancy include iron supplementation, fortification of staple foods with iron, health and nutrition education, control of parasitic infections, and improvements in sanitation. During pregnancy, women need additional iron to ensure they have sufficient iron stores to prevent iron deficiency. Therefore, in most LMIC iron supplements are used extensively by pregnant women to prevent and correct iron deficiency and anaemia during pregnancy.

If a woman is diagnosed with anaemia in the antenatal period (Hb <11g/dl during antenatal care, give 120mg of elemental iron and 400 micrograms of folic acid daily until her Hb concentration rises to normal (Hb 11g/dl or higher). Thereafter, she can continue with the standard daily antenatal iron and folic acid dose (or the intermittent regimen if daily iron is not acceptable due to side-effects) to prevent recurrence of anaemia.

Malaria in pregnancy (Chapter 8)

Intermittent preventive treatment with sulfadoxine-pyrimethamine is recommended for all pregnant women in areas where malaria is endemic. Treatment should start in the second trimester and doses should be given at least one month apart, with the objective of ensuring that at least three doses are received.

- Give the woman two long-lasting insecticide-treated bed nets (one for herself and one for her family) at the booking visit.
- Test for malaria at each visit in endemic areas.

Hookworm in pregnancy

- Preventive chemotherapy (deworming), using single-dose albendazole (400mg) or mebendazole (500mg) is recommended as a public health intervention for pregnant women after the first trimester in areas where hookworm is endemic.
- Infected pregnant women in non-endemic areas should receive anthelminthic treatment in the second or third trimester on a case-by-case basis. A single dose of albendazole (400mg) or mebendazole (500mg) should be used.
- Local policies should be adhered to.

Rhesus D alloimmunisation

Definition: Rhesus D alloimmunisation is a condition that occurs when anti-rhesus antibodies in a pregnant woman's blood cross over to the fetus leading to destruction of red blood cells. This leads to intrauterine anaemia or haemolytic disease of the newborn.

Screening and management

It is estimated that 15% of women are Rhesus D negative. Antibodies are generated in a rhesus negative woman upon exposure to Rhesus D positive red blood cells commonly via a previous pregnancy with a Rhesus D positive baby or rarely, blood transfusion. The process is called sensitisation.

- Rhesus typing should be done as part of antenatal booking bloods to identify rhesus negative women. These women are the offered further screening in pregnancy and immunoprophylaxis (if available).
- Antenatal prophylaxis with anti-D immunoglobulin in non-sensitized Rh negative pregnant women at 28 and 34 weeks of gestation to prevent Rhesus D alloimmunisation is recommended (if available).

Rhesus negative women can develop Rhesus antibodies if they have a Rhesus positive newborn, causing haemolytic disease of the newborn in subsequent pregnancies. Administering anti-D immunoglobulin to a Rhesus negative women within 72 hours of giving birth to a Rhesus positive baby is an effective way of preventing Rhesus D alloimmunisation and haemolytic disease of the newborn in subsequent pregnancies.

Women who require specialist care

- Women who have had a previous obstetric fistula (vesciovaginal or rectovaginal)
- Women who have undergone female genital mutilation

Chapter 4: Antenatal care: subsequent visits

In this chapter, you will find information about:

- The schedule of antenatal care visits
- What to do during a subsequent antenatal visit
- Early detection and treatment of problems
- Prevention of complications using safe, simple and cost-effective interventions
- Health promotion using health messages and counselling

Antenatal care visit schedules

The World Health Organization Antenatal Care Model (2016), recommends that antenatal care models have a minimum of eight visits to improve women's experience of care and improve neonatal outcomes. However, in low-resource settings this may be difficult to achieve. However, it is important to ensure that all pregnant women attend as often as possible and that the care provided is of the highest standard.

Table 4.1 An overview of visits during pregnancy

Weeks of Pregnancy	Why see the woman?	What is conducted?
12-16 weeks	This is usually the first or booking visit □ Assess woman's obstetric and general health needs, including psychosocial well-being □ Plan for the pregnancy and birth	□ See Chapter 3 for more details □ Confirmation of pregnancy □ Dating/viability scan (if ultrasound is available) □ Determine estimated delivery day □ Full physical examination □ Investigations including: blood pressure, urine test for protein and glucose, Hb, syphilis, HIV, malaria and tuberculosis □ Discuss place of delivery □ Arrange subsequent visit date and place
Between 18 and 34 weeks, usually visits every 4 weeks		
18-22 weeks	Anomaly scan (if ultrasound is available) Reassess woman's obstetric and medical history, including psychosocial well-being	A scan of the baby to confirm: □ Single or multiple pregnancy □ The placental position □ Fetal wellbeing □ Abnormal fetal development And: □ Discuss results of anomaly ultrasound scan □ Check blood pressure and urine for protein □ Measure symphysis fundal height □ Check fetal heart rate

24-28 weeks	Reassess woman's obstetric and medical history, including psychosocial well-being	□ Check blood pressure and urine for protein □ Measure symphysis fundal height □ Check fetal heart rate
28-32 weeks	Reassess woman's obstetric and medical history, including psychosocial well-being Check the lie and presentation of fetus	□ Check blood pressure and urine for protein □ Measure symphysis fundal height □ Check fetal heart rate □ Administration of Anti-D if required and available □ Screen for anaemia
Between 30 and 38 weeks, usually visits every 2 weeks		
32-38 weeks	Reassess woman's obstetric and medical history, including psychosocial well-being Agree the time of Caesarean section, if elective Caesarean section is necessary Prepare for birth in an emergency	□ Check blood pressure and urine for protein □ Measure symphysis fundal height □ Check fetal heart rate □ Check presentation
Between 38 and 40 weeks, usually visits every week		
38	Reassess woman's obstetric and medical history, including psychosocial well-being	□ Check blood pressure and urine for protein □ Measure symphysis fundal height □ Confirm fetal lie and presentation, fetal heart rate
40	Reassess woman's obstetric and medical history, including psychosocial well-being	□ Check blood pressure and urine for protein □ Measure symphysis fundal height □ Confirm fetal lie and presentation, fetal heart rate □ Review birth plan □ Plan for repeat visit in one week if the woman has not yet given birth
41	Reassess woman's obstetric and medical history, including psychosocial well-being	□ Check blood pressure and urine for protein □ Measure symphysis fundal height □ Confirm fetal lie and presentation, fetal heart rate □ Offer a membrane sweep □ Offer date for induction of labour at 40^{+10} days if low risk □ If high risk, decision for induction of labour should be made by the most senior healthcare provider.

At each visit, introduce and welcome using respectful maternity care (Chapter 1)

- All women have the right to the highest attainable standard of health and well-being during pregnancy including with regard to the physical, mental and social components of health
- Aim to provide the best quality of care available within your setting
- Greet the woman by name, offer her a seat, introduce yourself
- Explain in detail what you will do during the visit and obtain the woman's consent
- Explain the results and implications of all examinations and investigations performed
- Document all findings on the woman's antenatal card
- Ask the woman her reason for coming to the clinic and whether she wants her companion or other family member included in the discussion
- Ensure the woman's privacy and confidentiality throughout all discussions and examinations is maintained as needed

Taking the history

- General assessment: how is the woman feeling, discuss and screen for psychosocial issues? (Chapter 14).
- Does she have any complaints (symptoms)?
- Ask if she is there for a scheduled visit, for a specific complaint or problem.
- If the woman has come for a follow-up visit within a week of the previous visit, assess the problem or complications requiring follow-up as a matter of priority.
- Measure blood pressure and check urine for protein at each antenatal visit to screen for pre-eclampsia.

Conducting the examination

Clinical observations (Table 3.4 for normal parameters)

- Respiratory rate (beats per minute)
- Pulse rate (per minute)
- Blood pressure (mmHg)
- Temperature (°C)

General examination

- Conjunctival pallor
- Sclera – jaundice
- Mouth (bleeding gums/ulcers/thrush)
- Goitre
- Skin (Lumps/rashes/ulcers)
- Peripheral oedema: ankles
- Central oedema: lower back

Obstetric Examination

- Symphysis fundal height
- Fetal heart rate
- Lie of the fetus
- Presentation of the fetus

Routine examination for fetal wellbeing

An aim of antenatal care is to detect abnormalities of fetal growth and to ensure fetal wellbeing. Methods for this include abdominal palpation, symphysis fundal height measurements, auscultation of the fetal heart, ultrasound scan and maternal observation of fetal movements (Chapter 9).

Symphysis fundal height measurement

Measure and record symphysis fundal height at each antenatal appointment. Symphysis fundal height measurement is a method of fetal growth assessment that uses a tape measure to measure the symphysis fundal height, in order to assess the size of the uterus and fetus. Between 28 -36 weeks of gestation, the symphysis fundal height measurement in centimetres usually corresponds to the number of weeks of gestation (± 2 weeks).

Methods for symphysis fundal height measurement

Procedure

- Explain the procedure to the woman and ensure she has an empty bladder. Ask the woman to lie back on a couch.
- Ensure privacy and confidentiality.
- Gently palpate the abdomen to identify the uterine fundus.
- When measuring symphysis fundal height, the tape measure should be in contact with the skin.
- Measure the distance from the uterine fundus to the upper rim of the symphysis pubis. The tape should not be stretched too tight.

Inform the woman of the result and enter the correct measurement on the antenatal card. If available, plot on the symphysis fundal height graph or a customised growth chart, against the weeks of gestation.

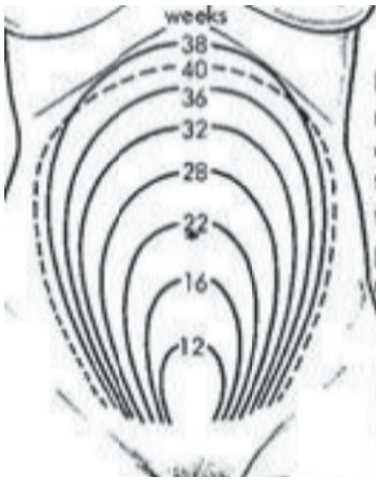
If the symphysis fundal height measurement is less than expected, this could be because:

- The baby is not growing well – small-for-gestational age or intrauterine growth restriction
- There is not enough liquor – oligohydramnios
- The baby is in transverse lie

If the symphysis fundal height measurement is more than expected, this could be because:

- There is more than one fetus – multiple pregnancy
- There is more than normal liquor – polyhydramnios
- The baby is bigger than normal – macrosomia
- Fibroid uterus

Figure 4.1: Estimated symphysis fundal height measurement



Fetal heart rate, fetal lie and presentation

Ask the woman if she can feel fetal movements and if the movements are in a normal pattern. Check the fetal heart rate by auscultation of the fetal heart using a pinard or a handheld doppler.

Fetal lie

The fetal lie should be longitudinal. Usually the fetal lie will stabilised around 34-36 weeks. If the fetus is transverse or oblique lie after 34-36, this will be a concern. It is important to check for any reason why the fetus would be in this position, for example, check the placental site by ultrasound scan to exclude placenta praevia.

Fetal presentation

The fetal presentation may change until the presenting part is fully engaged (usually around 37 weeks). The most frequent presentation is cephalic (head first) but breech presentation occurs in 3% of woman at term. Confirm suspected fetal malpresentation by an ultrasound assessment (Chapter 9).

Ultrasound examination

One ultrasound scan before 24 weeks of gestation (early ultrasound) is recommended for pregnant women to estimate gestational age, improve detection of fetal anomalies and multiple pregnancies, reduce induction of labour for post-term pregnancy, and improve a woman's pregnancy experience.

Diagnostic ultrasound examination can be useful in a variety of specific circumstances were there are pregnancy complications or concerns about fetal growth. Ultrasound allows for early detection of problems that may not be obvious, such as intrauterine growth restriction, malpresentation, placenta praevia and, in addition, by allowing accurate gestational age estimation, leading to timely and appropriate management of pregnancy complications. Specialists can use ultrasound to monitor the growth and well-being of the developing baby (Appendix 3).

Vaginal speculum examination

A vaginal speculum examination is conducted only if this is clinically indicated e.g. the woman complains of abnormal discharge or leakage of ammonitic fluid. In cases of bleeding in pregnancy a vaginal speculum examination is needed to confirm the presence and the severity of bleeding and to assess if the cervix is closed or open.

[!] Never conduct a digital vaginal examination if a pregnant woman is bleeding.

Before conducing a vaginal speculum:

- Ensure informed consent
- Ensure privacy and confidentiality
- Use a chaperone

During a vaginal speculum examination check for:

- Vulval and vaginal skin changes (excoriation, ulcers or vulval varicosities)
- Leakage of urine (spontaneous or provoked)
- Abnormal vaginal discharge – normal discharge is colourless and odourless
- Amniotic fluid in case of suspected rupture of membranes
- Female genital mutilation (type)

Health information and education

During antenatal care, the healthcare provider has the opportunity to discuss a variety of importance health topics with the woman. The healthcare provider can provide information that will help a woman to make informed decisions that will promote her well-being and that of her baby.

Important topics which women may have questions and/or concerns about during and after pregnancy include:

- The common problems and discomforts associated with pregnancy such as morning sickness, heartburn, constipation, lower back pain (Chapter 5).
- The onset of and signs of labour including:
  - Regular, progressively painful contractions
  - Lower back pain
  - A 'show' – this sometimes happens before labour starts and is a mucus-like discharge often with some blood experienced by the woman
  - Rupture of membranes with drainage of amniotic fluid
- Pain relief options for labour

Healthcare providers can use each antenatal visit to emphasis well-being during pregnancy, including nutrition and prevention of anaemia, malaria prophylaxis and essential care of the newborn, including breastfeeding.

Birth and emergency preparedness

- Discuss birth plan: where the woman wants to deliver and how she will get transport organised.
- Discuss with the woman what to do in case of emergencies and where to go for help.
- Give her and her family information on the danger signs to watch out for
  - □ Head: headaches, blurred vision, convulsion, loss of consciousness
  - □ Chest: difficulty breathing, chest pain, shortness of breath
  - □ Abdomen: severe pain, vomiting, epigastric pain
  - □ Pelvis: vaginal bleeding, loss of amniotic fluid, foul smelling vaginal discharge
  - □ Multisystem: high fever

[!] All women should be advised to attend a healthcare facility if they experience any of the above danger signs.

At the end of each antenatal consultation, document all findings and discussions in the antenatal card and/or record. Ensure all women are aware of when next to attend for routine antenatal care and emphasise that women are welcome to seek care at any time if they have any concerns.

Chapter 5: Common discomforts during pregnancy

In this chapter, you will find information about:
- Common discomforts women experience during pregnancy
- Manage common discomforts
- Recognise when common discomforts become pathological and need additional treatment

It is normal for a woman's body to go through many changes in pregnancy. Sometimes these changes can cause the woman discomfort. This chapter describes the common discomforts in pregnancy and gives advice on what advice a healthcare provider can give a woman. It is also important that a healthcare provider recognises when symptoms become pathological and require additional treatment or referral. In this chapter, all common conditions that occur are described by each of the organ systems. These common problems can occur at any time during the pregnancy.

There are several common disorders of pregnancy related to the gastrointestinal system:
- Reflux/heartburn
- Nausea and vomiting
- Constipation
- Haemorrhoids

Heartburn

Heartburn is common in pregnancy and can occur in all trimesters, increasing in severity in later pregnancy. It is characterised by a burning feeling or pain in the stomach, or between the breasts, which can be associated with acid reflux. Heartburn is associated with the relaxing effect of progesterone on smooth muscle. It is more common as the pregnancy progresses as the growing uterus displaces the woman's stomach to a position higher than usual. Acid reflux occurs as a result of this and causes the burning feeling. Reduced gut motility and gastric emptying also may contribute to heartburn in pregnancy. This is not dangerous and usually goes away after the birth of the baby.

Symptoms of heartburn can be like epigastric pain associated with pre-eclampsia. If a woman reports new epigastric pain after 20 weeks' gestation, exclude pre-eclampsia, i.e. check blood pressure and perform urinalysis, assess fetal growth, check for symptoms of pre-eclampsia and perform a baseline set of bloods.

Dietary advice and other modifications
- Avoid foods that irritate the stomach e.g. spicy or greasy foods, coffee.
- Eat small frequent meals and more often rather than less frequent and large meals.
- Avoid eating and drinking at the same time to reduce stomach volume.
- Avoid eating late at night or within 3 hours of going to sleep.
- When sleeping, or lying down, it helps to keep the head higher than the stomach (e.g. using pillows to prop up, or blocks under the top end of the bed if sleeping in a bed.

Treatment using antacids

- Simple antacids can be used intermittently.
- Liquid antacids are more effective than solid antacids.
- Avoid taking an antacid at the same time as iron tablets as gastric acid facilitates the absorption of iron. Take antacids at least one hour after iron tablets.
- Safe first line treatments such as calcium and magnesium-based antacids i.e. Gaviscon or magnesium trisilicate are considered safe in pregnancy.
- Ranitidine 150mg twice daily can effectively treat oesophageal reflux if first line treatment does not work.
- For severe symptoms, omeprazole can be prescribed after a medical review.

Nausea and vomiting

Many women experience nausea during the first trimester of pregnancy. Half of these women will experience vomiting. Nausea and vomiting is more common in multiple pregnancy, previous history in prior pregnancy and molar pregnancy. Nausea and vomiting is closely linked to the rise on βhCG levels in the beginning of the pregnancy.

Management of nausea

Educate women and reassure them that nausea and vomiting is common in early pregnancy and usually resolves spontaneously by 16-20 weeks and is not associated with poor pregnancy outcomes. Reassurance that this phase will naturally improve, often alleviates anxiety.

Encourage the woman to try any of these remedies:

- Before bed or during the night, eat a food that contains protein, such as beans, nuts or cheese.
- Eat bananas, dry bread, or other grain food upon waking up in the morning.
- Eat many small meals instead of two or three larger ones, and take small sips of liquid often.
- Drink a cup of mint, cinnamon or ginger tea two or three times a day, before meals.

Hyperemesis gravidarum

This is a rare condition of pregnancy. It is a condition defined by prolonged vomiting and nausea leading to dehydration, ketosis and electrolyte derangement (Chapter 6).

Constipation

Constipation (difficulty in passing stool) is common in pregnancy as a result of the progesterone effect on gut motility. Constipation in pregnancy is made worse with iron.

Management

To prevent or treat constipation, a pregnant woman can:

- Eat more fruits and vegetables
- Eat whole grains (brown rice and whole wheat, instead of white rice or white flour)
- Drink at least eight cups of water a day
- Walk, move and exercise every day
- Stool softener and/or laxatives are best avoided in pregnancy
- Stimulants such as bisacodyl, senna and sodium docusate are more effective than bulk forming laxatives such as ispaghula husk (fybogel) in women who do not respond to dietary changes

Haemorrhoids

Haemorrhoids are swollen veins around the anus and often cause burning or itching. Sometimes they bleed when the woman passes stool, especially if she is constipated. Prolonged sitting or standing can make haemorrhoids worse. Women should be reassured that haemorrhoids will usually resolve after delivery.

Management

- Women should be advised that preventing constipation will help to resolve haemorrhoids
- Standard topical haemorrhoid cream can be used if anal itching and pain persist.
- Rarely thrombosed prolapsed haemorrhoids require surgical removal.

Musculoskeletal and back pain

Back and joint pain

Back pain is very common in pregnancy. Relaxin is a hormone produced by the ovary and the placenta with important effects in the female reproductive system and during pregnancy. In the third trimester, it relaxes the ligaments in the pelvis and woman's joints. This can put a strain on the joints of her lower back and pelvis which can cause backache. Too much standing in one place, leaning forward, or hard physical work can also cause back pain.

Management

- Regular exercise in water, massage therapy, back care physiotherapy classes can alleviate backache.
- Applying warmth to the lower back e.g. massage, hot water bottle or warm clothes
- Simple pain relief tablets taken regularly e.g. paracetamol is safe in pregnancy and effective
- Reduce heavy work e.g. lifting, long periods of standing

Symphysis pubis dysfunction

Symphysis pubis dysfunction is a collection of signs and symptoms of discomfort and pain in the pelvic area, including pelvic pain radiating to the upper thighs and perineum and tenderness on palpation of the pubic bones. Symptoms are exacerbated with movement e.g. walking, climbing stairs and are relieved with rest. Symphysis pubis dysfunction is most common in the second and third trimesters. Symptoms can become very debilitating, resulting in some women using crutches for mobility.

Management

- Simple pain relief, pelvic support and reassurance can offer some relief.
- A tight girdle or a belt can be worn about the hips.

Headaches

Headaches are common in pregnancy and are usually harmless. However, any headache during pregnancy must begin by ruling out secondary causes such as pre-eclampsia, especially if there is high blood pressure or swelling of the face or hands if the headache does not resolve.

Healthcare providers should screen all women for hypertension if they present with a headache and refer to an appropriate healthcare provider for management if they have hypertension. See Chapter 6 for more information regarding screening and treatment.

If pre-eclampsia has been ruled out, give simple analgesia, and ensure the woman drinks sufficient water each day. Arrange follow-up for the woman.

Abdominal pain

Many women will experience mild abdominal pain due to the normal physiological changes during pregnancy. Medical complications such as appendicitis and cholecystitis can prove challenging to diagnose during pregnancy because symptoms of these conditions can mimic normal pregnancy discomforts.

Timing of abdominal pain in relation to stage of pregnancy provides key information to diagnose specific conditions such as preterm labour. A detailed history and examination are essential to the diagnosis of the cause of abdominal pain in pregnancy.

- **Round ligament pain**: This normally presents as a sharp stabbing pain when women change positions, or it can also be an achy, dull, lingering pain. Round ligament pain is caused by the two large ligaments that run from the uterus to the groin. As the uterus grows, these ligaments are stretched and create discomfort. This pain is generally reported in the second trimester, and considered to be harmless.

- **Braxton Hicks contractions**: Many women report that Braxton Hicks feel like a tightening of the stomach muscles so that the stomach feels firm or hard. It is important to differentiate Braxton Hicks from true contractions. True contraction will be closer together, last for a longer period of time, and are painful. True contractions will normally take a woman's breath away, so women should be advised that if they are able to carry on their normal activities, then it is most likely Braxton Hicks. Braxton Hicks can sometimes be caused by dehydration, so women should be advised that drinking water to stay hydrated can help eliminate this problem.

- In addition to those listed above, there are several other common abdominal discomforts that can be experienced during pregnancy and are generally non-threatening. Although many women who experience abdominal pain have healthy pregnancies, there are times when abdominal pain can pose a serious risk. A woman should be advised that if they have any of the following symptoms, they should contact a healthcare provider immediately.

[!] Women should be advised to contact a healthcare provider immediately if any of the following symptoms accompany abdominal pain or discomfort:

- Severe or persistent pain
- Vaginal spotting or bleeding
- Fever
- Chills
- Vaginal discharge
- Light-headedness
- Discomfort while urinating
- Nausea and vomiting

Varicose veins

Swollen veins that appear in the legs are called varicose veins and are very common in pregnancy. Varicose veins may develop in up to 40% of pregnant women. The increase in blood volume during pregnancy and effect of progesterone relaxing the muscular walls of the veins causes increased pressure on the veins. Varicose veins often improve three to four months following birth. Support such as compression stockings and elevation of the legs as much as possible will provide comfort to women.

Management

- Elevate the legs when at rest
- Avoid prolonged standing or immobility
- Avoid tight or restrictive clothing
- Regular exercise improves blood circulation. Encourage ankle flexion exercise for at least 30 minutes per day
- Compression stockings may relieve swelling and aching of legs but should be removed at night
- If resting for long periods, women are advised to lie on their left side which decreases pressure on the veins in the legs and feet (the inferior vena cava is on the right side, and left-sided position relieves it of the weight of the uterus)

Leg cramps

Many pregnant women have foot or leg cramps (sharp sudden pain and tightening of a muscle). These cramps especially come at night, or when women stretch and point their toes. To stop the cramp, flex the foot (point it upward) and then gently stroke the leg to help it relax. Eating more foods high in calcium and potassium can help relieve cramps (e.g. milk and cheese).

Oedema

Swelling of the feet and ankles is very common in pregnancy due to oedema, the retention of fluids in the body's tissues. Under the force of gravity, the retained fluid tends to collect in the feet. Advise the woman to sit with her feet raised as often as possible, to allow the fluid to be absorbed back into the circulatory system. Swelling of the feet is usually not harmful. However, if

ankle oedema does not reduce at night and/or there is also noticeable swelling of the hands and face at any time, this can be a sign of pre-eclampsia (Chapter 9).

Management

Swelling in the feet may improve if the woman puts her feet up at least two or three times a day.

Carpal tunnel syndrome

Oedema of pregnancy may contribute to median nerve compression within the carpal tunnel in the hand. Symptoms are localised to the radial half of the hand and include numbness, burning sensation and tingling that may impair sensory and motor hand function.

Management

- Wrist splints
- Analgesia, for example paracetamol
- Corticosteroid injections are sometimes used in severe cases under the care of a specialist.

Itching

Some women will experience itching in pregnancy. This can be caused by:

- Pre-existing skin conditions such as eczema
- Coincidental conditions which have occurred during the pregnancy such as scabies or vulvovaginal candidiasis
- A number of pregnancy-associated conditions, for example obstetric cholestasis

The majority of itching in pregnancy is due to pruritus gravidarum with the itching commencing in the second and third trimester. Pruritus is itching without any an evidence of a rash or any of the above causes being identified. The itching is often localised to the abdomen, palms, soles or it is widespread. It rapidly resolves after delivery and treatment, if needed, is symptom-based. Itching may also be due to obstetric cholestasis which is a diagnosis of exclusion (Chapter 9).

Management

- Bathe less frequently, if possible, as washing dries the skin. The axillae, genital area, and under the breasts can be washed daily, but other skin areas can be washed 2-3 times weekly.
- Use cool or lukewarm water (hot water can be drying).
- Avoid bubble bath, soap and perfumed products.
- Avoid vigorously drying the skin and pat it dry instead.
- A cool shower may offer immediate short-term relief from itching, but excessive showering should be avoided as this may dry the skin.
- Nails should be kept short to minimize any skin damage from scratching. Rubbing rather than scratching is advised if the urge to relieve the itch cannot be ignored.
- Clothing that does not irritate the skin (e.g. cotton or silk) should be worn, avoiding wool or synthetic fabrics.
- Spicy foods, alcohol and caffeine should be avoided as they may cause vasodilation, which can worsen itch.

Frequency of urination

Urinary frequency is a common complaint throughout pregnancy, especially in the first and last months. This happens because the growing fetus and uterus presses against the bladder and it will stop once the baby is born.

Management

If the woman must get up throughout the night to go to the toilet you can advise her to cut out drinks late in the evening but ensure that she drinks plenty during the day. Later in pregnancy some women find it helps to rock backwards and forwards when they are on the toilet. This lessens the pressure of the uterus on the bladder so it will empty properly. If urinating hurts, itches, or burns, the woman may have a bladder infection. The diagnosis and management of urinary tract infections are discussed in Chapter 7.

Vaginal discharge

Pregnant women often have increased vaginal discharge, especially near the end of pregnancy. It may be clear or yellowish. This is normal. However, the discharge can be a sign of an infection if it is white, grey, green, lumpy, or has a bad smell, or if the vagina itches or burns.

Management

Women should be advised of normal physiological vaginal discharge changes in pregnancy. If there are any concerns with regard to the quantity, colour or odour of the vaginal discharge, women should be assessed for possible sexually transmitted infections (STI) (Chapter 7).

Mental health

Before, during and after pregnancy, women can experience a wide range of mental health problems. The impact these conditions have on the woman and her family are wide ranging, particularly if they are left untreated. Many people are familiar with postnatal depression but are not aware of the other mental health conditions that many women experience, ranging from anxiety conditions such as post-traumatic stress disorder to postpartum psychosis (Chapter 14).

Many women worry when they are pregnant, especially about the baby's health and about giving birth. A woman's worries about other problems in her life may also become more intense when she is pregnant. Women with these feelings need emotional support, someone to listen to their worries and to encourage them to feel hopeful. They may also need help to solve the problems they are having in their lives, e.g. changes in relationships with husbands/partners and/or financial worries.

Chapter 6: Medical conditions during pregnancy

In this chapter, you will find information about medical conditions in the:

- Gastrointestinal system (hyperemesis gravidarum)
- Cardio-pulmonary system (hypertensive disorders, asthma, venous thrombotic disease, and cardiac disease)
- Endocrine system (diabetes, hyperthyroidism, hypothyroidism)
- Nervous system (epilepsy)
- Haematological system (anaemia, sickle cell and thalassaemia, Rhesus disease)

Hyperemesis gravidarum

Definition

Hyperemesis gravidarum is a severe form of nausea and vomiting in pregnancy, which affects about 0.3-3.6% of pregnant women, usually in the first trimester. In severe cases, there is dehydration, ketosis, electrolyte imbalance and a loss of weight. During starvation (due to prolonged nausea and vomiting), the body breaks down proteins in muscles to produce energy, leading to the production of ketones, that can easily be detected in the urine by a simple test. If a woman is severely dehydrated, she needs to be admitted to a healthcare facility for intravenous rehydration and medication.

Investigations

- Full blood count: haematocrit will confirm the severity of dehydration; white cell count to rule out infection
- Urea and electrolytes: provide a baseline and guide for intravenous rehydration
- Thyroid function tests: only if clinical suspicion of hyperthyroidism
- Urine dipsticks and culture: confirm severity of ketosis and exclude infection
- Liver function test: prolonged vomiting can lead to deranged liver function tests. These are often transient and reversible.
- Ultrasound scan, if available:
  - Confirm viable intrauterine pregnancy
  - Exclude multiple pregnancy
  - Exclude molar pregnancy

Treatment

- Intravenous fluids: Hartman's solution or 0.9% saline with either 20mmol or 40mmol of potassium chloride added, depending on the severity of hypokalaemia.
- Anti-emetics: first line anti-emetics are promethazine and cyclizine; second line are metoclopramide and procholorperazine. In intractable cases, a short course of steroids can be used.
- Thiamine replacement: supplements can be given as intravenous pabrinex (if available).
- Consider thromboprophylaxis, if available.
- Gradual introduction of oral intake.

Hypertension

Hypertension is common in pregnancy and defined as blood pressure >140/90mmHg on at least two occasions taken at least four hours apart or one reading of >170/110mmHg. Regular measurements of blood pressure and checking urinalysis for proteinuria are effective tools to diagnose hypertensive disorders. The recognition and management of pre-eclampsia are presented in Chapter 9.

Definition

- **Pre-existing/chronic hypertension:** This is hypertension diagnosed prior to pregnancy or before 20 weeks of gestation age. This is common and affects around 10% of women.
- **Pregnancy induced (gestational) hypertension:** This is hypertension that has developed after 20 weeks, resolves after delivery and in not associated with proteinuria. This affects around 5% of woman.

Measurement of blood pressure

- Always check blood pressure manually in the first instance
- Ensure the woman is rested, right arm is relaxed and supported at heart level
- Use appropriate size cuff
- Take at least two measurements on the same arm
- Check the severity of hypertension

Table 6.1 Classification of hypertension

	Diastolic (mmHg)	Systolic (mmHg)
Mild	90-99	140-149
Moderate	100-109	150-159
Severe	≥110	≥160

Management

Table 6.2 Management of hypertension during pregnancy

	Severity of hypertension		
Management	**Mild**	**Moderate**	**Severe**
Measure blood pressure	Once a week	Twice a week	4 times a day
Test for proteinuria	At each visit	At each visit	Daily
Blood test	Only for routine care	Test urea and electrolytes, liver function tests, and urate (if available).	Test weekly: full blood count, urea and electrolytes, liver function tests, and urate (if available).
Admit to the healthcare facility	No	Yes, for observation, blood pressure control and to exclude proteinuria Discharge if blood pressure controlled and no proteinuria.	Yes, until blood pressure is 159/109 or lower if no proteinuria.

Treatment

Treat all women with severe hypertension (≥160/110mmHg)

- **First line – methyldopa**: loading dose 500mg by mouth followed by 250mg by mouth twice a day up to 1g by mouth three times a day depending on how the blood pressure responses.
- **Second line – nifedipine**: slow release 10mg by mouth twice a day, up to 40mg by mouth twice a day, depending on how the blood pressure responses.
- **Third line – labetalol**: 100mg by mouth twice a day, up to 200mg by mouth three times a day (avoid in asthmatics).

Monitoring of women with pregnancy-induced hypertension is important as there is an increased risk of pre-eclampsia. Educate all women to understand the danger signs of pre-eclampsia (Chapter 9):

- Headache, especially frontal
- Visual disturbances, blurring or flashing before the eyes
- Epigastric pain
- Central oedema

Diabetes

Diabetes may exist prior to pregnancy (Type 1 diabetes and Type 2 diabetes) or may develop during pregnancy (gestational diabetes).

Pre-existing diabetes, is a metabolic syndrome characterized by hyperglycaemia due to a deficiency of or insensitivity to insulin. Prevalence is estimated at 0.4% of pregnancies.

Definitions

1. Type 1 diabetes is due to insulin deficiency, as a result of an autoimmune response against the Islet cells in the pancreas.
2. Type 2 diabetes is due to insulin resistance, and is associated with an increase in age and obesity.
3. Gestational diabetes is defined as any degree of glucose intolerance resulting in hyperglycaemia that is first recognized during pregnancy. Gestational diabetes accounts for up to 90% of diabetes in pregnancy.

Table 6.3: Potential complications of diabetes during and after pregnancy

Developing baby/newborn	Woman
■ Birth defects (heart defects or neural tube defects, spontaneous miscarriage ■ Preterm delivery ■ Macrosomia ■ Stillbirth ■ Newborn complications: respiratory distress syndrome, hypoglycaemia, polycythaemia, neonatal hypocalcaemia and neonatal jaundice	■ Chronic hypertension ■ Renal dysfunction ■ Pre-eclampsia ■ Polyhydramnios ■ Increased need for operative deliveries ■ Shoulder dystocia

Effect of pregnancy on diabetes

- Deterioration of glucose tolerance may occur during pregnancy, and careful blood sugar monitoring is necessary in order to alter treatment according to need.
- Certain complications (e.g. retinopathy in Type 1 diabetes) may worsen in pregnancy.

Diagnosis of gestational diabetes

It is estimated that abnormal maternal glucose regulation occurs in 3-10% of pregnancies. Different countries screen for diabetes during pregnancy in different ways.

Risk factors include:

- Body mass index of greater than 30kg/m^2
- Previous gestational diabetes
- Previous macrosomia
- Family history of diabetes
- Ethnicity with a high prevalence of diabetes (e.g. South Asian)

Gestational diabetes is suspected if:

- There are symptoms of diabetes (polyuria, polydipsia, and/or unexplained weight loss).
- A fasting blood glucose is >7.8mmol/L.

If a risk factor is present or gestational diabetes is suspected, then an Oral Glucose Tolerance Test (OGTT) could be considered between 24 and 28 weeks of gestation (or 16-18 weeks if previous gestational diabetes). Gestational diabetes (or Impaired glucose tolerance) can be diagnosed during an OGTT on any one of the following values:

- A fasting plasma glucose level of 5.6mmol/L or above or
- A 2-hour plasma glucose level of 7.8mmol/L or above

There is no agreement internationally for the use of fasting or random glucose or glycosuria on dipstick in the diagnosis of gestational diabetes.

Principles of management of Type 1 and Type 2 diabetes in pregnancy

The principles of management of Type 1, Type 2 and gestational diabetes are similar and require referral and increased monitoring. For women with pre-existing diabetes, antenatal care must be supervised by specialists as there is a higher risk of complications.

For gestational diabetes, once diagnosed, good glucose control is important, either with diet alone or combined with metformin or insulin, under the care of a specialist. It is important that women are given dietary and lifestyle advise as well as medication.

Pre-conception care

- Ideally, a woman with pre-existing diabetes would have received counselled during pre-conception care regarding the importance of good glycaemic control before conception and throughout pregnancy to reduce the risk of adverse fetal and neonatal outcomes
- Where available, offer monthly glycosylated haemoglobin level (HbA1c)
- Advise women to aim for HbA1c below 6.1%
- Advise women with HbA1c above 10% to avoid pregnancy until control is improved

Antenatal care

Ideally, care should be given by a medical doctor specialising in the management of diabetes, in conjunction with healthcare providers in maternal health. Women with diabetes require an antenatal visit every 1-2 weeks to assess glycaemic control. Women with diabetes need testing strips and a diary to keep a record of their glucose levels, before meals three times daily as a minimum.

- Before or as soon as pregnancy is confirmed: stop oral hypoglycaemic agents, apart from metformin, and commence insulin if required
- Aim to keep fasting blood glucose between 3.5 and 5.9mmol/L and two hour postprandial blood glucose below 7.8mmol/L during pregnancy
- Women and their families should be warned of symptoms of hypoglycaemia and advised to carry high sugar drinks with them at all times in case of severe hypoglycaemia
- Identify and treat infections e.g. urinary tract infections
- Monitor fetal growth clinically or by ultrasound
- Increase frequency of visits and monitor blood glucose at each visit
- Induction of labour is recommended around 38 weeks in woman with poor glucose control and diagnosed macrosomia
- Use of prostaglandin to ripen the cervix reduces the Caesarean section rate
- Remain vigilant for the need for an operative delivery, shoulder dystocia, vaginal tears and post-partum haemorrhage in a woman who is pregnant with a macrosomic baby (>4.5kg)

Thyroid disease

The thyroid gland is an endocrine gland located in the neck. It makes two hormones that are secreted into the blood: thyroxine (T4) and triiodothyronine (T3). These hormones are necessary for all the cells in the body to work normally.

Thyroid disease in pregnancy is uncommon but is currently undetected in low-resource settings.

Table 6.4: Thyroid disease in pregnancy

	Hyperthyroidism	**Hypothyroidism**
Definition	Hyperthyroidism is a state of excessive thyroid hormones, caused by over activity of the thyroid gland	Hypothyroidism is a state of a reduction in thyroid hormones, caused by underactivity of the thyroid gland
Incidence	0.2% of pregnancies	1% of pregnancies
Cause	Graves' disease – an autoimmune disorder that causing the overgrowth of the thyroid gland	Commonly, autoimmune disorders cause hypothyroidism for example: - Hashimoto's thyroids - Atrophic thyroiditis
Risks to pregnancy	Increased risk of miscarriage, intrauterine growth restriction, preterm labour (PTL) Untreated hyperthyroidism can result in perinatal mortality	Increased risk of miscarriage, pre-eclampsia, small-for-gestational age, stillbirth, impaired neurological development
Symptoms	Heat intolerance Palpitations and tachycardia Vomiting Mood swings Weight loss	Cold intolerance Lethargy, tiredness Dry skin, constipation Fluid retention Weight gain
Signs	Palmar erythema Tremor Eye changes – lid lag, lid retraction	Goitre
Investigations	Thyroid function tests Increased free T4 or Increased free T3 And decrease in thyroid stimulating hormone	Thyroid function tests Decreased free T4 or And increase in thyroid stimulating hormone
Management	Ideally seek advice or refer to a medical doctor Oral thioamides, for example carbimazole 40mg or propylthiouracil (PTU) 400mg daily for 4-6 and titrate down depending on Thyroid function tests. Check Thyroid function tests every trimester and after delivery	Ideally seek advice or refer to a medical doctor Thyroxine 100-200ug/day and titrate up depending on Thyroid function tests Check Thyroid function tests every trimester and after delivery

Asthma

Asthma is chronic, reversible, potentially life-threatening bronchoconstriction affecting about 4% of pregnant women, characterised by two or more of the following:

- Wheeze
- Breathlessness
- Cough
- Chest tightness

Symptoms are often more pronounced at night or in the early morning, or provoked by exposure to specific allergens, exercise or cold, or exacerbated by drugs including aspirin and other non-steroidal inflammatory drugs (NSAIDS) (voltarol) or beta blockers (labetalol). Triggers include dust, exercise, cold air, pollen. Often, there is a personal or family history of asthma, eczema or allergies.

Diagnosis

Spirometry is the gold standard, to measure peak expiratory flow rate. Normal values are adjusted depending on height and age. Spirometry is a part of pulmonary function testing which is undertaken by a specialist.

Asthma in pregnancy

In most cases, asthma does not pose a major problem in pregnancy but, for a few women, it may deteriorate and become life-threatening. It is important to recognise when the condition is deteriorating and take appropriate action. Poorly managed asthma may increase the risk of preterm labour, intrauterine growth restriction, fetal hypoxia and intrauterine fetal death.

The physiological changes of pregnancy may be problematic for the asthmatic woman. As the diaphragm is pushed up by the growth of the uterus, the woman may experience a fall in lung capacity, exacerbating the effects of a fall in peak expiratory flow rate which may be expressed as a percentage of the woman's previous best rate. A fall of 20% or more represents a serious exacerbation of asthma.

Acute severe asthma

Symptoms: any one of:

- Severe wheeze/breathlessness/cough/chest tightness
- Inability to complete sentences in one breath
- Exhaustion, altered conscious level

Signs

- Respiratory rate ≥25/min or poor respiratory effort
- Heart rate ≥110/min
- SpO_2 <92%
- Peak expiratory flow rate <33-50% best or predicted
- Silent chest
- Cyanosis
- Arrhythmia
- Hypotension

Differential diagnosis of severe asthma

- Consider severe anaemia
- Consider tuberculosis
- Consider pulmonary embolus
- Consider lower respiratory tract infection

Treatment of mild asthma: step-up guidance

- **Step 1**. Mild intermittent asthma

Short acting inhalational beta-agonist as required (salbutamol or terbutaline inhaler)

- **Step 2**. Regular preventative therapy

Add 200-800mcg inhaled corticosteroid daily

- **Step 3**. Initial add-on therapy

Long acting beta-agonist, increase inhaled steroid up to 800mcg daily if required
If control is still inadequate, stop long acting beta agonist and add leukotriene receptor antagonist or theophylline

- **Step 4**. Persistent poor control

Increase inhaled steroid to 2000mcg daily, add in fourth drug, e.g. Leukotriene receptor antagonists (LRA) or theophylline or oral beta-agonist

- **Step 5**. Continuous use of oral steroids

Add oral steroid in lowest dose to maintain control

[!] Oral steroids and leukotriene receptor antagonist should not be withheld during pregnancy if they are required to achieve good control. They are not harmful to the developing baby.

Treatment of a woman presenting with severe asthma

Severe asthma in pregnancy is a medical emergency and the women will require specialised treatment. After stabilisation, women should be referred to a higher-level healthcare facility. Oxygen supplementation must be given to maintain a saturation of 94-98% to prevent maternal and fetal hypoxia.

Beta-agonists

- O_2 nebulisers are preferred for the nebulizer – 6L/min required
- Inhaled beta 2 agonists are the first line drug to be given as soon as possible
- If response is poor, repeat doses 15-30 min intervals or at 5-40mg/hr

Steroids

- Prednisolone 40-50mg daily or parenteral hydrocortisone 400mg
- Consider IM Methyl prednisolone 160mg as an alternative
- Treatment should be continued for 5 days or until recovery

After recovery

- Oral steroids can be stopped, if the woman received inhaled steroids (apart from those on maintenance treatment)
- Ipratropium bromide (0.5mg 4-6 hourly) beta 2 agonists for women with acute life-threatening asthma
- Magnesium sulphate (1.2-2gm IV over 20 minutes) for women with poor response to inhaled bronchodilator treatment
- Aminophylline (5mg/kg loading dose over 20 minutes) for very severe cases of acute life-threatening asthma

Asthma is a potentially life-threatening condition which requires urgent and vigorous treatment. No treatment should be withheld because of pregnancy. Treatment is aimed at re-establishing optimum peak flow and oxygen saturation rapidly to prevent further complications for both the woman and fetus.

Venous thrombotic disease

The two types of venous thrombotic disease include deep vein (leg or pelvic) thrombosis and pulmonary (lung) thrombosis. The risk factors and management are similar.

Risk factors of venous thrombosis disease

- Past history of venous thromboembolic events – either deep vein thrombosis or pulmonary embolus
- Women with a known history of thrombophilia for example antiphospholipid syndrome
- Body Mass Index >30
- Age >35 years
- Parity ≥3
- Smoking
- Severe varicose veins
- Pre-eclampsia
- Multiple pregnancy
- Close relative with a history of deep vein thrombosis
- Sickle cell anaemia

Transient risk factors

- Severe dehydration e.g. secondary to hyperemesis
- Infection
- Long distance travel, especially by airplane
- Prolonged bed rest/immobility

Deep vein thrombosis

Definition

A deep vein thrombosis occurs when a blood clot forms in a deep vein, either in the calf or the pelvis. A fragment of clot may break off and travel through the venous system to the heart via the pulmonary arterial tree to the lungs, where it becomes lodged. If the clot is large, this is an immediately life-threatening condition.

Incidence

The risk of a deep vein thrombosis increases four to six-fold during pregnancy and further still in the post-partum period but overall the incidence in during and after pregnancy is low, affecting one to two women per 1000.

Management

Maintain a high index of suspicion in women with multiple risk factors.

Signs of deep vein thrombosis:

- Painful swollen warm calf
- Redness of calf

An ultrasound scan can be used to locate the thrombus. Treat with anticoagulants on the basis of significant clinical suspicion.

Pulmonary embolism

Pulmonary embolism is a blockage of an artery in the lungs by a substance that has travelled from elsewhere in the body through the bloodstream (embolism). Symptoms of a pulmonary embolism may include shortness of breath, chest pain particularly upon breathing in, and coughing up blood. Pulmonary embolism usually results from a blood clot in the leg that travels to the lung.

Signs of pulmonary embolism

- Acute onset of chest pain, can be severe
- Shortness of breath
- Sudden maternal collapse
- Sudden death

Investigations

- Electrocardiogram may show characteristic changes in S1Q3T3 leads with prominent S wave in lead 1, Q wave and inverted T wave in lead 3 reflecting right ventricular strain
- Sinus tachycardia
- Arterial oxygen saturation will be low in cases of large pulmonary embolism
- Chest X-ray is inconclusive but may be helpful in ruling out other causes of chest pain and shortness of breath such as severe acute pneumonia or pneumothorax
- Definitive tests include a ventilation/perfusion (V/Q scan) or a computerised tomography pulmonary angiography (CTPA) scan. These are rarely available in low resource settings so treatment should start based on clinical judgement and in the absence of chest X-ray signs to the contrary.

Treatment of venous thromboembolic events

Initial treatment of venous thromboembolic events

- Low molecular weight heparin
- Intravenous unfractionated heparin
- Subcutaneous unfractionated heparin

Maintenance treatment for venous thromboembolic events
- Oral anticoagulants
- Heparin
- Clopidogrel
- Vena cava filters

With severe life threatening pulmonary embolism, if no heparin is available a difficult decision must be made as to whether to treat the woman with warfarin. Although this does carry significant fetal risks (highest during development in the first trimester), failure to treat may result in maternal death if the embolism extends. If there is sufficient clinical suspicion in the absence of any available heparin, it is, therefore, better to initiate treatment with warfarin than to risk a maternal death. After a thrombo-embolic event, treatment and monitoring should be maintained for six months.

Cardiac disease

Cardiac disease, a common cause of indirect maternal death, represents a diverse group of conditions which may be pre-existing, for example, long standing valvular heart disease, or which may arise in pregnancy, as for example, peri-partum cardiomyopathy.

Previously undiagnosed cardiac disease in pregnancy should be suspected in the presence of:
- Unexplained tachycardia
- New onset shortness of breath
- Chest pain
- Hypotension

Incidence of the various types of heart disease presenting in pregnant women vary. In countries with a significant incidence of poorly treated childhood rheumatic fever there will be a higher incidence of rheumatic valvular disease.

Physiological changes of pregnancy relevant to cardiac disease

By as early as 8 weeks' gestation, cardiac output increases by 20%, reaching a maximum increase of 40% by 28 weeks. Heart rate and stroke volume increase and peripheral resistance falls. Plasma volume increases by 50%. During the second stage of labour, cardiac output increases by a further 50%. Following delivery as the uterus contracts, 500ml blood is added to the general circulation. The early puerperium is therefore a time of additional risk for cardiac patients.

The different types of heart disease may be classified as follows:

- Structural

Table 6.5: Structural abnormalities of the heart

Valvular abnormalities	Non-valvular abnormalities
Valvular abnormalities include stenotic valvular lesions, e.g. aortic or mitral valve stenosis or regurgitate (leaky) lesion's. Aortic or Mitral valve regurgitation.	Marfans syndrome: is a genetic condition affecting connective tissue. The aortic root can be dilated and there is a risk of aortic rupture during pregnancy especially if the aortic root is more than 4cm wide, and in these cases pregnancy is contra-indicated due to the risk of rupture.

In general pregnancy is better tolerated by those with regurgitate lesions, and those with mild to moderate left to right shunting.

Those with stenotic valve lesions or right to left shunt, especially with pulmonary hypertension, are at significantly greater risk.

- Cyanotic congenital heart disease

This carries risks to both woman and fetus, including worsening cyanosis, and risks of death. Maternal mortality is particularly high in cases of Eisenmenger's syndrome where there is a reversed shunt (right to left) and pulmonary hypertension. Such women should be strongly counselled against becoming pregnant.

- Cardiomyopathy

Hypertrophic obstructive cardiomyopathy is an autosomal dominant genetic disorder. It is mainly well tolerated in pregnancy but beta blockers may be necessary to control symptoms.

- Peripartum cardiomyopathy

This condition arises in late pregnancy or several months into the puerperium, with an incidence of up to 1 in 1,000. This is a dilated cardiomyopathy. The condition presents with increasing dyspnoea, palpitations and pulmonary and peripheral oedema. There is a 40% risk of venous thromboembolism so prophylactic anticoagulation should be provided. Maternal mortality in severe cases is 50%. Treatment includes beta blockers, angiotensin-converting-enzyme inhibitors and diuretics.

Dysrhythmias

Sinus tachycardia and palpitations may be a normal feature in pregnancy, and ectopic beats are common in both woman and fetus in general with no adverse consequences. Anaemia and thyroid disease should be excluded or treated, and a full history taken. Sudden arrhythmic death syndrome is sudden cardiac death in the absence of all other causes. Such deaths are neither predictable or preventable.

Myocardial ischaemia and infarction

Myocardial ischaemia is increasing in women of childbearing age, especially in countries with high levels of obesity, diabetes and smoking. Management is similar to non-pregnant women, although angiotensin-converting-enzyme inhibitors and statins should be avoided.

Cardiac disease presents particular challenges in the pregnant woman. Physiological changes of pregnancy may mimic symptoms leading to a delay in diagnosis. Pregnant women with cardiac disease require specialist care for the best outcomes. All women need investigated with electrocardiograms, chest x-rays and echocardiograms.

Epilepsy

An epileptic seizure is a sudden alternation of consciousness, motor, sensory, automatic or psychic events owing to abnormal excessive or synchronous neuronal activity in the brain. Epilepsy is a brain disorder characterised by a predisposition to epileptic seizures and affects approximately 1 in 150 women of childbearing years.

Effects of pregnancy on epilepsy

An estimated 50-60% of women with epilepsy on medication will remain seizure-free during pregnancy but alterations in the metabolism of some anticonvulsants mean that the risk of seizures increases for 40-50% women with known epilepsy. The dose of some anticonvulsants (especially lamotrigine and levetiracetam) need to increase substantially during pregnancy as a consequence. Pain, tiredness and fear may be trigger factors for epileptic convulsions during pregnancy.

Effects of epilepsy and anticonvulsants on pregnancy

Anticonvulsants are associated with an increased risk of congenital abnormalities. Ideally, women should be advised to take 5mg folic acid from 3 months prior to conception and throughout the first trimester. Congenital abnormalities particularly associated with anticonvulsant medication are neural tube defects, cardiac abnormalities and facial defects. The risks are highest for those on sodium valproate with up to 10% experiencing some congenital abnormality and 30-40% of offspring experiencing learning disabilities. The risk is dose dependant with those on the highest doses at most risk.

If available, detailed fetal anomaly scans should be provided at 20-24 weeks' gestation.

Women on the following drugs should be provided with oral vitamin K 10mg daily from 36 weeks until delivery:

- Phenobarbitone
- Carbamazepine
- Phenytoin
- Primidone
- Topiramate
- Oxcarbazepine

Anaemia

Classification of anaemia

Anaemia is a decrease in the number of red blood cells, haematocrit or haemoglobin (Hb) level and the severity increases during pregnancy.

Anaemia is diagnosed when the haemoglobin (Hb) level of pregnant women is below 11g/dl and can be grouped as

- **Mild**: Hb 10.0-10.9g/dl
- **Moderate**: Hb 7.0-9.9g/dl
- **Severe**: Hb <7.0g/dl

Causes of anaemia

During pregnancy, the growth of the fetus, placenta, and larger amount of blood circulating blood in the woman lead to an increase in the demand for nutrients, especially iron and folic acid. Due to the disproportionate increase in plasma volume in relation to the red blood cell mass during pregnancy, haemodilution occurs. In non-pregnant women, a normal haemoglobin is Hb <12.0g/dl or above. In pregnancy, Hb <11.0g/dl in the first trimester or <10.5g/dl in the third trimester is considered to be anaemia.

Causes and treatment of anaemia

Treatment of anaemia depends on the cause.

Table 6.6 Causes and treatment of anaemia

Causes	Treatment
▪ Iron deficiency (commonest) ▪ Depletion of iron stores	▪ Dietary advice ▪ Treatment of infestations, hookworm ▪ Oral or parental iron supplementation
▪ Folate deficiency ▪ Depletion of folate stores because of inadequate diet	▪ Dietary investigation and supplementation regime
▪ Thalassaemia (inherited disorder) ▪ Alpha (minor) ▪ Alpha (major) ▪ Beta (minor)	▪ Screening ▪ Iron supplementation/transfusions ▪ Rare, unlikely to reach childbearing age ▪ Transfusions
▪ Sickle cell disease (inherited disorder) ▪ When there is haemoglobin S with another abnormal haemoglobin	▪ Screening (haemoglobin electrophoresis) ▪ Education of parents for risks (both parents with sickle cell trait) ▪ Ensure, during labour, that the woman does not develop dehydration or severe hypoxia which may precipitate a crisis
▪ Malaria	▪ Intermittent Preventative Therapy (IPT) using sulfadoxine-pyrimethamine combination after the first trimester ▪ Use of long-lasting insecticide-treated bed nets especially and indoor residual spraying ▪ Environmental sanitation for vector control

▪ Other parasitic infections (e.g. hookworm, schistosomiasis).	▪ Albendazole or mebendazole ▪ Education and advice to avoid re-infestation
▪ Chronic infection	▪ Antibiotics ▪ Any infection depresses erythropoiesis

Investigations

- Haemoglobin, ferritin level (<30ug/l indicates inadequate stores)
- Check serum and red cell folate
- Full blood count and peripheral blood film (to diagnose the type of anaemia)
- Stool examination to check for ova and cysts for parasitic infections. for parasitic infections
- Blood slide or rapid diagnostic tests to exclude malaria
- Blood group and Rhesus factor determination in case a blood transfusion is needed
- Screen for sickle cell disease

Management of anaemia

- If a woman is diagnosed with anaemia in the antenatal period (Hb <11.0g/dl in the first trimester or <10.5g/dl in the third trimester) give 120mg of elemental iron and 400 micrograms of folic acid daily.
- Check the woman's Hb level monthly until her Hb concentration rises to normal (Hb 11.0g/dl or higher).
- Thereafter, a woman can continue with the standard daily antenatal iron and folic acid dose (or the intermittent regimen if daily iron is not acceptable due to side-effects) to prevent recurrence of anaemia.

Parenteral iron therapy

- Consider administering parenteral iron therapy for a woman who is intolerant to oral preparation of iron.
- Consider referral to secondary care if severe anaemia detected after 36 weeks or the woman is symptomatic with severe anaemia (Hb <7.0g/dl).
- Admit to the healthcare facility for blood transfusion.
- Thereafter, maintain on iron 120mg plus folate 5mg orally once a day for six months during pregnancy and until three months postpartum.

[!] For women with congestive cardiac failure, administer a diuretic (e.g. frusemide 40mg IV) with each unit of blood. Transfuse as above slowly and maintain a strict fluid balance chart.

Prevention of anaemia

- Offer screening for anaemia at the booking visit and at 28 weeks. This allows time for treatment.
- Offer routine supplementation of iron (60mg elemental iron and folic acid 400 micrograms).
- Give intermittent preventive treatment of malaria in malaria endemic areas.
- Treat any concurrent infections, infestations and manage any other co-existing medical conditions as appropriate.

Give dietary advice which is appropriate for each woman depending on health status, religious and cultural preferences.

Sickle cell disease

Definition

Sickle cell disease is an inherited autosomal recessive condition, characterised by sickle-shaped red blood cells and chronic anaemia, due to the predominance of haemoglobin S (Hb S) and other abnormal haemoglobin.

Women with the sickle cell trait are carriers and usually asymptomatic.

- This abnormal Hb S variant results from the substitution of valine for glutamic acid at position 6 in the beta-globin chain.
- If both parents are carriers, there is a one in four chance that the fetus will have sickle disease.

Sickle cell disease increases maternal morbidity and mortality by enhancing the development of haemolytic anaemia, folic acid deficiency, embolism following bone marrow infarction and acute sequestration of red cells. The perinatal mortality rate is high in HbSS with a moderate increase in the other forms of sickle cell disease.

Symptoms and signs

Sickle cell disease is commonly diagnosed in infancy, and it presents with symptoms of chronic anaemia and/or infection.

The hallmark of sickling episodes is ischemia and infarction in various organs resulting in severe pain. Sickle cell crisis is a medical emergency and needs to be managed by specialists.

Effect of pregnancy on sickle cell disease

Pregnancy aggravates sickle cell disease and increases maternal morbidity and mortality due to:

- Haemolytic and folate deficiency anaemia
- Increased frequency of crises
- Pulmonary complications
- Congestive cardiac failure
- Increased risk of venous thromboembolic events
- Increased susceptibility to infections

Effects of sickle cell disease on pregnancy

- Increased risk of crises especially painful crisis affecting the bones and joints
- Anaemia during pregnancy is frequent and may be severe
- Bacterial infections especially urinary and respiratory tract infections
- Increased incidence of pre-eclampsia
- Increased risk of postpartum haemorrhage
- Miscarriage
- Preterm delivery

Effect on the developing baby/newborn

- Intrauterine growth restriction
- Intrauterine fetal death
- Low birth weight
- Birth asphyxia
- Early neonatal death

Management of sickle cell disease in pregnancy

Preconception care

- Folic acid supplementation from 1-5mg per day
- Immunisation against pneumococcus and influenza where possible
- Stop Hydroxyurea 3-6 months before pregnancy as it is teratogenic
- Malarial prophylaxis

Assessment for:

- Frequency of crises
- End organ damage (nephropathy, heart failure, stroke)
- Pulmonary hypertension

Management of sickle cell disease during antenatal care

- Prevent anaemia and infections
- Effective treatment of other medical and obstetric complications
- Proper management of other sickling complications
- Folic acid supplementation – 5mgs once daily; in areas with folate deficiency give 30mg at each visit using directly observed therapy
- Due to the risk of iron overload, iron treatment should be reserved for haematologically proven iron deficiency
- Antimalarial prophylaxis (intermittent preventive treatment with sulfadoxine-pyrimethamine)
- Closely monitor fetal growth and wellbeing and look out for intrauterine growth restriction; the woman must also be admitted when Hb level drops and/or she develops bone pain

Chapter 7: Infections during pregnancy

In this chapter, you will find information about:
- How to manage a woman with suspected sepsis during pregnancy
- How to screen for and manage infections during pregnancy including bacterial infections, chorioamnionitis, sexually transmitted infections and viral infections.

Types of infection in pregnancy

Bacterial Infections
- Urinary tract infection
- Typhoid fever

Obstetric conditions
- Chorioamnionitis

Sexually transmitted infections
- Syphilis
- Gonorrhoea
- Chlamydia

Viral
- Hepatitis
- Chicken pox
- Zika virus
- Dengue
- Ebola

Sepsis

Definitions

Sepsis is a systemic inflammatory response syndrome in response to infection. Many physiological derangements result not from the infectious agent itself, but from the body's response to it. The inflammatory response invoked by the presence of infection or inflammation is normally a physiological adaptive process designed to create conditions to allow the body deal with the sequelae of infection or inflammation. However, an inappropriately or excessively activated inflammatory response is damaging.

Systemic Inflammatory Response Syndrome (SIRS) is the body's generalised inflammatory response. The criteria are defined as presence of two or more of the following, as can be used as an early warning sign that there may be infection:
- Temperature (>38°C or <36°C)
- Heart rate (>90 beats per minute)
- Respiration rate (>20/min)
- White cell count (<4 or >12 10^9/L)

Septic shock is hypotension due to systemic inflammatory response syndrome (no identified source) or sepsis (identified source of infection) that is unresponsive to fluid resuscitation alone. This is a medical emergency and required specialist input to manage.

In women with suspected sepsis, the earlier treatment is started, the better the response and increased rate of survival. Conduct a full septic screen prior to starting intravenous, broad spectrum antibiotics (TDS Cefotaxime 2gm, TDS Metronidazole 500mg). Management can then be adjusted depending on culture and sensitivities from the septic screen.

Risk factors associated with sepsis

- Obesity
- Impaired glucose tolerance/diabetes
- Impaired immunity/immunosuppressant medication
- Anaemia
- Vaginal discharge
- History of pelvic infection
- History of group B streptococcal infection
- Cervical cerclage and other invasive procedures
- Prolonged spontaneous rupture of membranes
- General infection in close contacts/family members

Recognition of sepsis in the pregnant woman

All healthcare providers should be aware of the symptoms and signs of maternal sepsis and critical illness and of the rapid, potentially lethal course of severe sepsis and septic shock. Suspicion of significant sepsis should trigger an urgent referral to secondary care.

Clinical signs suggestive of sepsis include one or more of the following: pyrexia, hypothermia, tachycardia, tachypnoea, hypoxia, hypotension, oliguria, impaired consciousness and failure to respond to treatment. These signs, including pyrexia, may not always be present and are not necessarily related to the severity of sepsis.

Regular observations of all vital signs (including temperature, pulse rate, blood pressure and respiratory rate) should be recorded on an observation chart.

Explanation

- The signs and symptoms of sepsis in pregnant women may be less distinctive than in the non-pregnant population and are not necessarily present in all cases; therefore, a high index of suspicion is necessary.
- Healthcare providers should be aware of the symptoms and signs of maternal sepsis and critical illness.
- Disease progression may be much more rapid than in the non-pregnant state.
- Genital tract sepsis may present with constant severe abdominal pain and tenderness unrelieved by usual analgesia, and this should prompt urgent medical review.
- Severe infection may be associated with preterm labour.

Clinical features suggestive of sepsis

- Fever or rigors
- Diarrhoea or vomiting – may indicate exotoxin production (early toxic shock)
- Rash (generalised streptococcal maculopapular rash or purpura fulminans)
- Abdominal/pelvic pain and tenderness
- Offensive vaginal discharge (foul smell suggests anaerobic infection; yellow serous discharge suggests streptococcal infection)
- Productive cough
- Urinary symptoms

Investigations when sepsis is suspected

- Blood cultures are the key investigation and should be obtained prior to antibiotic administration; however, antibiotic treatment should be started without waiting for microbiology results.
- Serum lactate should be measured within six hours of the suspicion of severe sepsis to guide management. Serum lactate ≥4mmol/L is indicative of tissue hypo-perfusion.
- Any relevant imaging studies should be performed promptly to confirm the source of infection.
- Blood cultures and other samples as guided by clinical suspicion of the focus of infection (e.g. throat swabs, midstream urine, high vaginal swab or cerebrospinal fluid) should be obtained prior to starting antibiotic therapy as they may become uninformative within a few hours of commencing antibiotics but must not delay antibiotic therapy.

Management

- If sepsis is suspected, regular frequent observations should be made. The use of a basic observation chart is recommended. There should be an urgent referral to a higher-level healthcare provider. The expert advice of a microbiologist or infectious disease specialist should be sought urgently when serious sepsis is suspected.
- An observation chart should be used for all maternity inpatients to identify seriously ill pregnant women and refer them to higher level healthcare providers if their condition deteriorates. Early, goal-directed resuscitation has been shown to improve survival for non-pregnant women presenting with septic shock.

Causative organism

- The most common organisms identified in pregnant women dying from sepsis are Lancefield group A beta-haemolytic Streptococcus and E. coli.
- Mixed infections with both Gram-positive and Gram-negative organisms are common, especially in chorioamnionitis.
- Coliform infection is particularly associated with urinary sepsis, preterm premature rupture of membranes, and cervical cerclage.

General assessment of a woman with suspected sepsis during pregnancy

Assess
- Ask how long has the woman had a fever?
- Cough, productive?
- Colour of urine?
- Frequent, painful urination?
- Abnormal vaginal discharge?
- Diarrhoea or vomiting?

Conduct a top to toe examination
- Cardiovascular system: tachycardia, bounding pulse
- Respiratory system: shallow fast breathing, lung sounds rattle or wheezing
- Abdomen: extreme localised or generalised tenderness
- Breasts: tenderness, redness
- Neck: stiffness
- If there is any discharge – conduct a speculum examination – check for liquor loss, abnormal discharge

Septic screen
- Blood for full blood count, lactate, biochemistry profile, liver function tests, blood culture, malaria, syphilis and Hepatitis B and C, HIV
- Urinalysis for full culture and sensitivities
- High vaginal swab, if clinically indicated
- A stool sample for culture and sensitivities, if gastrointestinal symptoms
- A wound swab, if clinically indicated
- Sputum culture and screen for TB, if clinically indicated

Treatment
- Give antipyretic (paracetamol).
- Start presumptive treatment with parenteral broad-spectrum antibiotics (TDS Cefotaxime 2g, TDS Metronidazole 500mg) and antimalarial medication.
- Readjust treatment when laboratory test reports are ready.
- Refer for inpatient admission if needed, for further management.

[!] If a woman is hypotensive, this is a medical emergency. Call for help and admit to the healthcare facility.

Urinary tract infection

Definition
This is infection at any level of the urinary tract, from the kidneys to the urethra. Urinary tract infections are more common and can be more severe during pregnancy, due to the ureteric dilatation caused by the muscle relaxant effect of progesterone and the mechanical obstruction of the ureters caused by the pregnant uterus.

Types of urinary tract infection

- Asymptomatic bacteriuria (3-8%)
- Lower urinary tract infection – Cystitis (bladder infection) (1.3-3.4%)
- Upper urinary tract infection – Pyelonephritis (kidney infection) (1%)

Urinary tract infections in pregnancy are associated with or can lead to complications including preterm birth and if untreated can lead to sepsis and renal failure.

Asymptomatic bacteriuria

Definition
The definition is based on laboratory criteria. It is defined as a pure culture (one species of organism) of at least 100,000 colony-forming units per ml of clean-catch midstream urine specimen in a woman with no symptoms or signs of a urinary tract infection.

Diagnosis
- Midstream urine for culture and sensitivity

Cystitis

Definition
Infection of the bladder.

Symptoms
- Increased frequency of urination and urgency
- Dysuria (discomfort or pain on urination)
- Cloudy urine
- Change in the smell of urine

Investigations
- Urine dipstick test (presence of leucocytes and/or nitrites)
- Midstream urine for microscopy (presence of white cells and/or bacteria)

Pyelonephritis

Definition
Infection of the kidney.

Clinical features
- Fever (>37.5°C), increased pulse rate, increased respiratory rate
- Pain and tenderness in the loin region
- Vomiting

Diagnosis
- The diagnosis of pyelonephritis in pregnancy can usually be made on the basis of the clinical symptoms and signs
- Midstream urine for microscopy (presence of white cells, red cells and bacteria)

Treatment
Treatment of a urinary tract infection in pregnancy consists of antibiotic therapy and supportive measures.

Antibiotic therapy

Asymptomatic urinary tract infection or cystitis
- Oral Amoxicillin 500mg 8 hourly for 3 days, or
- Oral Cefuroxime 250mg 12 hourly for 3 days, or
- Oral Nitrofurantoin 50mg 6 hourly for 7 (avoid during the first trimester)
- A three-day course of antibiotic treatment will suffice for most women with lower urinary tract infection, but if symptoms persist or worsen despite treatment, a urine culture and sensitivity must be done and further antibiotics prescribed per the results of the test.

Pyelonephritis
- Refer or admit the woman to a healthcare facility.
- In uncomplicated pyelonephritis: IV Ampicillin 2g 6 hourly + IV Gentamycin 5mg/kg body weight daily or in three divided doses. Once the woman is fever-free for 48 hours, give oral Amoxicillin 12 hourly for 14 days.
  OR
- IM or IV Ceftriaxone 1g daily for 3 days, then oral Cefixime 400mg 12 hourly for 14 days.
- In complicated pyelonephritis: IM or IV Ceftriaxone 1g daily + IV Gentamicin IM 5mg/kg body weight daily or in 3 divided doses for 3 days, then oral Cefixime 400mg 12 hourly for 14 days.

Supportive therapy
- Pain relief with paracetamol
- Adequate fluid intake or vigorous hydration with IV crystalloids to increase urine output
- Manage fever with tepid sponging

Typhoid fever

- Typhoid fever, also known as enteric fever is caused primarily by Salmonella enterica species, more commonly the Salmonella typhi.
- It is spread via the faecal-oral route.
- When it enters the body, it invades the intestinal wall and spreads through the bloodstream to all organs.
- The indiscriminate use of antibiotics for this condition has resulted in the resistance of Salmonella typhi to previously effective treatments such as chloramphenicol.

Symptoms
Typhoid fever begins 1-2 weeks after the ingestion of the organism and can present the same way as malaria with
- Fever
- Joint pains
- Severe headache
- Malaise
- Dry cough

- Abdominal pain
- Delirium, confusion
- Initial constipation followed by diarrhoea

Clinical features of a woman with typhoid fever may be different depending on the geographic region, the infecting bacteria strain and the timing of treatment. Pregnant women can be affected just as the general population and present as above. It is important to manage the typhoid in a timely and appropriate manner to avoid its potential complications.

Complications

- Perforation of the bowel with peritonitis
- Intestinal haemorrhage
- Heart conditions (valvular heart disease)
- Pulmonary oedema
- Severe intravascular haemolysis
- Acute renal failure
- Acute psychosis

Diagnosis

- Diagnosis of typhoid fever is primarily based on strong clinical suspicion.
- Headache is a considerable part of diagnosis and its absence should shed some doubt in the diagnosis.
- Widal test: this is a serological test that measures the titres of the Salmonella typhi antibodies found in a patient. It is important that the titres are read in a sequential way i.e. what is evidence of infection is rising titres of the antibodies. This would reflect presence of active infection. A single test of O titre of 1:100 or more and of H titre of 1:200 or more is significant. A rising titre of four-fold or higher in an interval of seven to ten days is more meaningful than one test. High levels of antibody are found in some healthy people in endemic areas and after vaccination.
- The results of the Widal test may also be falsely positive in such diverse conditions as chronic liver disease, malaria, brucellosis, systemic lupus erythematosus, acute rheumatic fever and streptococcal sore throat due to polyclonal activation of B lymphocytes. The Widal test should be restricted only to culture negative cases of typhoid fever in which the clinical features are typical of typhoid fever
- Always rule out malaria
- Culture isolation of the organism remains the criterion standard for diagnosis (blood cultures are positive during first ten days of fever, stool cultures are positive after the tenth day of fever up to fourth or fifth week, urine cultures are positive during second and third week).

Treatment

Pregnant women with suspected typhoid fever should be admitted to the healthcare facility. The treatment option depends on whether the woman is suffering from uncomplicated or complicated typhoid fever.

Antibiotic therapy

- The choice of antibiotics needs to be guided by the geographic region where the organism was acquired and the results of cultures once available.
- Treatment should not be delayed for confirmatory tests
- Prompt treatment drastically reduces the risk of complications

1st Line Treatment

- Amoxicillin 1g 3 times a day for fourteen days
- IV Ceftriaxone 2g once daily for seven days may be preferred in pregnancy. It can be administered on an outpatient basis.

Chorioamnionitis

Definition

Chorioamnionitis is an ascending bacterial infection associated with the rupture of membranes, that occurs before or during labour. The condition can result in preterm birth or serious infection in the woman and the baby.

Risk factors

- Preterm premature rupture of membranes
- Membranes that are ruptured (the water has broken) for an extended period e.g. prolonged labour
- Multiple vaginal examinations during labour (in women with ruptured membranes)
- Pre-existing infections of the lower genital tract (Chlamydia trachomatis, Group B streptococci)

Clinical features

Clinical chorioamnionitis should be suspected if one or more of the following are noted:

- Maternal pyrexia (>37.5°C)
- Maternal tachycardia (pulse rate >120/min)
- Fetal tachycardia (>160/min)
- Abdominal pain or tenderness
- Uterine tenderness
- Offensive vaginal discharge
- Evidence of ruptured membranes

Diagnosis

The diagnosis is based on clinical signs and symptoms. Start treatment as soon as chorioamnionitis is suspected. Maternal pyrexia (above 37.5°C), offensive vaginal discharge and fetal tachycardia (rate above 160 beats/minute) indicate clinical chorioamnionitis. Additional laboratory tests are listed below.

Laboratory tests

- Increased white cell count, increased C-reactive protein
- High vaginal and endocervical swab: positive Gram stain and culture

Complications of chorioamnionitis

- Uterine atony
- Increased risk of Caesarean section
- Postpartum haemorrhage
- Septicaemia
- Septic shock
- Wound infection after Caesarean section
- Post-partum endometritis
- Pelvic abscess
- Fetal distress
- Neonatal sepsis
- Cerebral palsy

Treatment

This is an obstetric emergency. Admit to the healthcare facility. Maternal temperature, pulse and fetal heart rate auscultation should be checked at least every 4-8 hours and documented on an observation chart. Treatment consists of intensive antibiotic therapy and plan for immediate delivery (depending on gestational age of the baby). Give corticosteroids if the baby is premature (<34 weeks' gestation).

Antibiotic therapy

- **First-line choice**: IV Clindamycin 900mg 8 hourly + Gentamicin 5mg/kg body weight daily or in three divided doses
- **Second-line choice:** IV Ampicillin 2g 6 hourly + IV Gentamicin 5mg/kg body weight daily or in three divided doses + IV Metronidazole 500mg 8 hourly.
- For woman who are allergic to beta-lactam antibiotics, Erythromycin 1g 6 hourly can be substituted for Ampicillin.

Hepatitis

Hepatitis is inflammation of the liver. It can be caused by different mechanisms mediated by infectious, autoimmune or toxic agents. Viral infections are the most common. There are five different types of hepatitis viruses: Hepatitis A, B, C, D and E. Hepatitis A and E are spread by the faecal-oral route, while the other three (B, C and D) are transmitted via the bodily fluids (intravenous drugs, blood transfusion, delivery or sexual activity).

Hepatitis A

Vertical transmission to the fetus does not occur, whatever the stage of maternal infection. There is a risk of premature delivery in case of infection during the third trimester. Immunisation by inactivated vaccine can be performed during pregnancy.

Hepatitis E

Hepatitis E is rare, but the risk of developing fulminating hepatitis is ten times higher during pregnancy. Epidemics have been observed.

Hepatitis B

Of the five known hepatitis viruses, the most significant during pregnancy is the Hepatitis B virus.

- Hepatitis B has very serious sequelae.
- The virus is endemic across many low resource settings.
- Individuals with a Hepatitis B infection may become chronic carriers of the virus.
- Chronic carriers have a high risk of developing chronic hepatitis, active chronic hepatitis, cirrhosis of the liver and hepatocellular carcinoma.
- The risk of becoming a carrier is related to the age at the time of infection; the younger the age, the higher the risk.
- If infection occurs at birth, the risk is 90%; if it occurs at 1-4 years of age, the risk is 25%. The risk for adult is 5-10%.
- Immunisation at birth should be given
- Safe and effective vaccines for prevention of Hepatitis B virus infection are available.
- The Hepatitis B virus can be transmitted horizontally and vertically (mother-to-fetus transmission),
- Transmission to the baby commonly occurs during delivery when the fetus may ingest large amounts of blood and vaginal secretions containing the virus.

[!] All pregnant women should be offered serological testing for the Hepatitis B virus surface antigen as part of antenatal routine screening (if available).

Clinical features of viral hepatitis

During the acute or initial infection with all types of hepatitis viruses, women are often asymptomatic.

Common symptoms

- Myalgia (painful muscles)
- Nausea and vomiting
- Fatigue and malaise
- Change in sense of smell or taste
- Right upper abdominal pain
- Pale stools and dark urine
- Generalised pruritus

Common signs

- Jaundice
- Hepatomegaly
- Splenomegaly
- Lymphadenopathy
- Right upper quadrant tenderness
- Severe illness with jaundice may occur
- Acute liver failure may develop

Risks for the fetus

- Premature birth if the women contracts hepatitis during the second or third trimester of pregnancy
- Trans-placental transmission or transmission of the virus during delivery

Diagnosis

- Based on serology: Hepatitis A, B and E viruses can be diagnosed by identification of their antibodies in serum
- Hepatitis C virus is diagnosed by enzyme-linked immunosorbent assay (ELISA)

Management of acute viral hepatitis

- Supportive therapy (IV infusion of normal saline and dextrose, restriction of fatty diet, prohibition of alcohol)
- Infection control measures
- Immunization to protect contacts of Hepatitis B virus infection
- Start babies of Hepatitis B virus infected women on passive and active hepatitis B virus immunization at birth
- Health education and counselling
- Screen for other sexually transmitted infections
- Partner notification and contact tracing
- Avoid alcohol
- Nutritional support

[!] There is no cure for viral hepatitis.

Sexually transmitted infections

Women can be screened for sexually transmitted infections if they report symptoms during or after pregnancy. It is important that women are informed about partner notification and contact tracing. They should also be advised about safe sex practices and the need to abstain from sexual contact until the infection has be treated.

Syphilis

This is a sexually transmitted disease caused by spirochete *Treponema pallidum.* It is very important to screen routinely as an infected pregnant woman can transmit the disease to the developing baby. Syphilis is responsible for a large number of stillbirths and neonatal deaths. All partners of infected women should be treated to prevent reinfection. The disease can also be transmitted via blood transfusion. At least 50% of women with acute syphilis suffer serious adverse pregnancy outcomes, that are potentially avoidable with effective treatment.

Complications include:

- Intrauterine growth restriction
- Stillbirth
- Neonatal death
- Preterm birth
- Congenital infection and anomalies

[!] All women should have a venereal disease research laboratory (VDRL) test done at booking to screen for syphilis.

If untreated, syphilis progresses through 4 stages:

- Primary syphilis is characterised by a solitary painless ulcer or chancre.
- Secondary syphilis manifestations include lesions affecting the skin and mucous membranes, malaise, fever, loss of appetite. and generalised lymphadenopathy.
- Early latent syphilis is an infection of less than two years' duration and has no clinical manifestations.
  - This is the contagious period that falls within the first 2 years of infection.
  - The incubation period averages 14-28 days but may last as long as 90 days.
- Late latent syphilis is an infection of more than two years' duration without clinical evidence of Treponema infection.
  - Includes benign late syphilis, cardiovascular and neuro syphilis
  - Late syphilis can arise as soon as one year after initial infection or up to 25-30 years later

Treatment

Antibiotic therapy

- Benzathine penicillin G 2.4 million units (1.8g) IM. Give a single dose for primary syphilis unless the woman is in her third trimester, then to have a second dose after 7 days to be given as 2 injections in separate sites. Give once a week for 3 weeks for secondary syphilis.
- Benzathine penicillin G 2.4 million units IM weekly for 3 weeks in late latent syphilis
- A missed dose in pregnancy is not acceptable. Pregnant women must repeat the full course.

If allergic to penicillin, then erythromycin 500mg QID for 14 days in early and 30 days in late syphilis should be given.

Trichomonas vaginalis

Trichomonas is a sexually transmitted infection caused by the flagellated protozoan, Trichomonas vaginalis. The infection may be asymptomatic or symptoms include offensive vaginal discharge and vulval itching in women.

Symptoms

- Offensive smelling vaginal discharge
- Pruritus vulvae

Investigations

- Speculum examination shows frothy, yellow-green vaginal discharge.
- Perform a high vaginal swab

Treatment

Metronidazole

- 2g orally as a single dose (during the first trimester if treatment is needed, a single dose is better than seven days). Women can be treated with 2g metronidazole in a single dose at any stage of pregnancy.
  OR
- 400 or 500mg orally, twice daily for 7 days, after first trimester.

Gonorrhoea

Definition
Gonorrhoea occurs when the bacterium Neisseria gonorrhoea colonizes the epithelial surfaces of the female urogenital tract, conjunctiva, pharynx, rectum or synovium. Neonatal infection can occur during delivery from an infected woman. This can lead to gonococcal conjunctivitis (acute bilateral purulent conjunctivitis), occurring in the first month of life and often in the first week, which is a major cause of blindness.

Symptoms
- Asymptomatic infections are much more frequent in women than in men.
- Vaginal discharge may be observed (as Neisseria gonorrhoea infects the endocervix rather than the vagina, it is less associated with vaginal discharge).
- Dysuria
- Vulvar itching or burning, local oedema

Diagnosis
- History and signs
- Gram negative bacteria seen by microscopy in purulent discharge
- Endocervical swab

Treatment
- IM Ceftriaxone, 250mg as a single dose
  OR
- Cefixime, 400mg orally, as a single dose

Chlamydia Trachomatis

Definition
Sexually transmitted infection due to the bacterium Chlamydia trachomatis.

Symptoms
- Chlamydial cervicitis is often asymptomatic
- Mucopurulent vaginal discharge (not always present)

Diagnosis
- Endocervical swab
- Urine specimen for culture
- Nucleic acid amplification test (gold standard)

Risks for the fetus
- The same as for gonorrhoea, even during the neonatal period.
- A small proportion of infants develop chlamydial pneumonitis, usually occurring between the ages of six weeks and three months with cough and tachypnoea but no fever.

Treatment
- Azithromycin, 1g orally, in a single dose
  OR
- Erythromycin 500mg orally twice a day for 14 days

Candida albicans (thrush)

[!] Candida albicans – this may or may not be a sexually transmitted infection.

This is a yeast (fungal) infection that is common during pregnancy especially during the second trimester. Candida is a normal vaginal commensal and only causes symptoms when the vaginal flora balance becomes altered due to changes in vaginal pH in pregnancy or antibiotic therapy. Candida infection during pregnancy may be asymptomatic but is usually associated with one or more the following:
- Pruritus vulvae
- Vaginal discharge (whitish, odourless, curd-like plaques adhering to the vagina) Possible erythema and/or oedema of the vulva and vagina

Investigation
A speculum examination shows curd-like plaques adhering to the vagina.

Treatment
Nystatin 100,000 IU intravaginal, daily for 14 days or topical or oral azoles, for example clotrimazole pessaries or fluconazole 150mg orally as a single dose.

Varicella zoster and chickenpox

Definition
Chickenpox is a very infectious illness caused by a virus called herpes zoster (part of the herpes family). The medical term for chickenpox is varicella. If a woman has previously had chickenpox, she has acquired immunity.

Signs and Symptoms
- The symptoms of chickenpox take between ten days and three weeks to appear – incubation period.
- The first signs are fever and feeling unwell.
- This is followed by the formation of watery blisters which can appear anywhere on the body.
- After a few days, the blisters burst, crust over and then heal. This may take up to two weeks.

A person with chicken pox is contagious from two days before the rash appears until the time when all the blisters have crusted over.

Diagnosis
Generally, the diagnosis of chickenpox is based on the rash seen on the body. If there is any doubt about the diagnosis, chickenpox can be confirmed with laboratory tests, including blood tests or a culture of a lesion sample.

Risks for the woman

- Complications that can occur include chest infection (pneumonia), inflammation of the liver (hepatitis) and inflammation of the brain (encephalitis).

Risks for newborn

- The risk of the newborn getting chickenpox depends on the time the woman acquires it during her pregnancy. The highest risk to the baby is when chicken pox occurs in the last four weeks of pregnancy.

Before 28 weeks of pregnancy

There is no evidence for an increased risk of early miscarriage. The baby is unlikely to be affected; however, there is a small chance that damage could occur to the eyes, legs, arms, brain, bladder or bowel. This only happens in fewer than 1 in 100 babies.

Between 28 and 36 weeks of pregnancy

The virus will be transmitted to the fetus, but will not cause any symptoms.

After 36 weeks of pregnancy

This is the time when the fetus is at greatest risk of getting chickenpox. If delivered within seven days of the chickenpox rash appearing or if chickenpox is acquired within the first week after birth, the newborn may get severe chickenpox.

Newborn babies who have chicken pox can be given varicella zoster immune globulin and treated with acyclovir (if available) and monitored closely after birth.

Management

- If more than 20 weeks pregnant, give aciclovir to reduce fever and symptoms.
- This should be given within 24 hours of the chickenpox rash appearing.
- Aciclovir is not licensed in pregnancy but does not appear to be harmful for unborn babies and therefore may also be considered for treatment before 20 weeks.

Treatment

- Prompt isolation of the woman until the lesions have crusted over
- Aciclovir 800mg orally 5 times a day for 7 days. Start within 24 hours of the onset of symptoms
- Skin lesions can be treated with calamine lotion to reduce itching

The recommended dose of intravenous aciclovir for Varicella zoster infections is 10mg/kg every 8 hours, although higher doses (12-15mg/kg) are sometimes used for life-threatening infections, especially in immunocompromised women.

Zika Virus Infection

Zika is a flavivirus that causes a mild self-limiting illness in the woman but can have significant effects on the unborn baby.

- Zika is spread mostly by the bite of an infected Aedes mosquito.
- Zika can be sexually transmitted.
- Zika can be passed from a pregnant woman to her fetus.

Symptoms in the woman
The illness is usually mild with symptoms lasting for several days to a week. The most common symptoms of Zika are:

- Fever
- Rash
- Joint pain
- Red eyes

Effect on the developing baby
Zika virus infection during pregnancy is a cause of significant congenital brain abnormalities, including microcephaly.

Diagnosis
A diagnosis of Zika virus infection can only be confirmed through laboratory tests on blood or other body fluids such as urine, saliva or semen by a specialist laboratory using polymerase chain reaction.

Treatment

- There is no specific antiviral treatment available.
- There is currently no vaccine to prevent Zika.

Haemorrhagic fevers

Dengue

Definition
Dengue, transmitted by the Aedes mosquito, is common in many low-resource settings. The clinical manifestations, treatment and outcome of dengue in pregnant women are similar to those of non-pregnant women but with some important differences.

Diagnosis
Misdiagnosis or delayed diagnosis is common due to some of the overlapping clinical and/or laboratory features. These include:

- Eclampsia or pre-eclampsia
- Haemolysis elevated liver enzymes and low platelet count (HELLP) syndrome
- Pneumonia
- Pulmonary embolism
- Various obstetric causes of per-vaginal bleeding
- Other infectious diseases

Risk of vertical transmission
The risk of vertical transmission is well established among women with dengue during the perinatal period.

Severe bleeding may complicate delivery and/or surgical procedures performed on pregnant women with dengue during the critical phase i.e. the period coinciding with marked thrombocytopenia with or without coagulopathy and vasculopathy.

Management

- Early admission for close monitoring and supportive therapy is recommended, especially for women close to full-term/labour.

Ebola virus disease

Definition

Ebola virus disease, previously known as Ebola Haemorrhagic Fever, is a severe, often fatal illness. It is caused by the Ebola virus, one of the 30 known viruses capable of causing viral haemorrhagic fever syndrome. Ebola virus disease is highly contagious and is transmission is through direct contact with body fluids, including blood, saliva, amniotic fluid, urine, sperm, tears, sweat, breast milk, vomit and faeces.

Symptoms

- Fever
- Severe headache
- Muscle pain
- Weakness
- Fatigue
- Diarrhoea
- Vomiting
- Abdominal pain
- Unexplained haemorrhage (bleeding or bruising, including vaginal bleeding)

Symptoms may appear anywhere from 2 to 21 days after exposure to the Ebola virus, but the average is 8-10 days. Recovery depends on good supportive clinical care and the woman's immune response. People who recover from the infection develop antibodies that last for at least 10 years.

Diagnosis

Diagnosing Ebola virus disease in a person who has been infected for only a few days is difficult because the early symptoms, such as fever, are nonspecific to the Ebola infection and very similar to fever in other infectious diseases such as malaria, typhoid fever and meningitis.

However, anyone suspected of having Ebola virus disease should be isolated and public health authorities notified if:

- Suspected early symptoms of Ebola are present
- The individual has had contact with:
  - Blood or body fluids from a person sick with or who has died from Ebola virus disease
  - Objects that have been contaminated with the blood or body fluids of a person sick with or who has died from Ebola virus disease
  - Infected fruit bats and primates (apes and monkeys)
  - Semen from a man with recent Ebola virus disease

The Ebola virus is detected in blood only after onset of symptoms, most notably fever, which accompany the rise in circulating virus within the woman's body. It may take up to three days after symptoms start for the virus to reach detectable levels.

Ebola virus disease is confirmed using the following investigations:

- Antibody-capture enzyme-linked immunosorbent assay (ELISA)
- Antigen-capture detection tests
- Serum neutralization test
- Reverse transcriptase polymerase chain reaction (RT-PCR) assay
- Electron microscopy
- Virus isolation by cell culture

Samples from women who have the Ebola virus are an extreme biohazard risk; laboratory testing on non-inactivated samples should be conducted under maximum biological containment conditions.

Management

Treatment for Ebola virus disease is being developed.

- Supportive therapy should be provided.
- All therapy must be administered with strict attention to barrier isolation.
- All body fluids should be handled with care.

Ebola virus disease and obstetric complications

Ebola virus disease in pregnancy is associated with a high rate of obstetric complications and poor maternal and perinatal outcomes including:

- Spontaneous abortion
- Prelabour rupture of membranes
- Preterm birth
- Antepartum and postpartum haemorrhage
- Intrauterine fetal death
- Stillbirth
- Neonatal death
- Maternal death

Healthcare providers caring for women with suspected or confirmed Ebola virus disease should apply extra infection control measures to prevent contact with the woman's blood and body fluids and contaminated surfaces or materials such as clothing and bedding.

When in close contact (within 1 metre) of women with Ebola virus disease, healthcare providers should wear:

- Face protection (a face shield or a medical mask and goggles)
- Clean, non-sterile long-sleeved gown
- Gloves (sterile gloves for some procedures)

Treatment

When an Ebola virus disease epidemic occurs, specialised isolation and treatment centres are set up to which any woman suspected of having the disease can be referred.

Chapter 8: HIV, TB and Malaria in pregnancy

In this chapter, you will find information about:
- Human immunodeficiency virus
- Tuberculosis
- Malaria

Human immunodeficiency virus

Human immunodeficiency virus (HIV) is a serious and potentially fatal viral illness, whereby the HIV attacks the immune system, causing immune dysfunction and reducing the ability for a woman to fight infection. This allows opportunistic infections to develop. In severe cases diseases that are clinical indicators of Acquired Immune Deficiency Syndrome (AIDS) develop and these can result in death.

Effective treatment with highly active antiretroviral therapy is available to reverse the effects of HIV on the immune system. Lifelong treatment is required to ensure HIV is suppressed.

Prevalence

Around the world, 1.5 million HIV infected women give birth every year, the majority in Sub-Saharan Africa. Mozambique, Nigeria, South Africa and Tanzania account for 50% of all HIV positive children. In 2013, it was estimated that 240,000 children were infected. In the same year, 30% of HIV positive pregnant women were not receiving antiretroviral medication.

Administering antiretroviral medication to HIV infected pregnant women can greatly reduce the probability of HIV transmission from mother to the newborn. Without antiretroviral medication, between 15-30% infants born to HIV positive mothers will become infected in pregnancy or during birth and an additional 5-15% through breastfeeding. With adequate maternal treatment, transmission rates fall to less than 5% in the breastfeeding population and less than 2% in the non-breastfeeding population.

Antenatal counselling and testing

All women should be counselled and offered immediate rapid HIV testing on their first antenatal visit. This may be the only occasion the woman presents herself for care and the opportunity must not be lost.

Explain to the woman that testing is very important because:
- HIV is a highly treatable condition.
- With good treatment, a woman can have a long and healthy life.
- Treatment will protect a woman from developing serious infections.
- Treatment vastly reduces the chances of transmission of HIV to the baby. Without treatment, there is a risk of up to 45% that the baby will become infected.

Explain to the woman why it is better to investigate and exclude co infection of syphilis, TB and malaria, explain the symptoms and signs of syphilis, TB and malaria and the effect on the woman and the baby.

Diagnosis

- Rapid diagnostic test using enzyme immunoassay to detect antibiotics
- Polymerase chain reaction to detect viral ribonucleic acid
- A positive test must be repeated to rule out a false positive

Disclosure to sexual partners

Despite the duty of confidentiality, a HIV positive woman should be encouraged to disclose her status to her sexual partner(s) so that they can also be offered testing and given advice regarding protection if discordant, or provided with treatment if also positive.

In endemic areas, women who are HIV negative can be offered retesting at 36 weeks or in the third trimester, as seroconversion may occur.

Monitoring

- The CD4 count (a measure of immune functionality) helps to determine a woman's risk of acquiring an opportunistic infection.
- The viral load (copies of virus per ml) determines the risk of mother to child transmission.
- Both CD4 and viral load testing should be provided at least once in each trimester, and especially around 36 weeks.
- If viral load is incompletely suppressed it is important to explore whether the woman is complying with treatment. This must be done in a blame-free and supportive manner, and further advice given as to the importance of compliance and the risks of developing resistance to the drugs with poor compliance. Resistance to antiretroviral drugs reduces treatment options in the future and exposes the women to the risk of developing opportunistic infections.

Women can be advised to seek medical help if any of the following develop:

- Fever
- Persistent diarrhoea
- Cough
- Dysuria
- Vaginal discharge
- Weight loss
- Skin rashes/infection
- Foul smelling lochia (if postnatal)

Treatment

Antiretroviral therapy inhibits viral replication and reduces the viral load. Women who are HIV positive should be offered immediate treatment with triple antiretroviral therapy. Ideally treatment should be started no later than fourteen week's gestation to allow adequate time for viral load suppression. Aim of treatment is to reduce the viral load to <50ml. Highly active antiretroviral therapy can be toxic and close follow-up is required by a specialist. There is no

evidence that any antiretroviral medication causes congenital abnormalities and women already on treatment prior to pregnancy should be strongly advised to continue their medication.

All women should be provided with treatment in line with Option B+. This means commencing treatment which should be life-long, regardless of CD4 count or viral load.

Preferred first line treatment:

- Tenofovir (TDF), + Lamivudine (3TC) or Emtricitabine (FTC) + Efavirenz (EFV) (fixed dose combination)

Alternative first line treatment:

- Zidovudine (AZT) + Lamivudine (3TC) + Efavirenz (EFV) or Nevirapine (NVP)
  OR
- Tenofovir (TDF) + Lamivudine (3TC) or Emtricitabine (FTC) + Nevirapine (NVP)

Possible side effects include nausea, diarrhoea and headache. These are usually transient.

Complications of HIV

- Kaposi's sarcoma
- Non-Hodgkin's lymphoma
- Opportunistic infections: pneumocystis carinii pneumonia, oesophageal candidiasis, cytomegalovirus causing hepatitis and atypical mycobacterial infections
- Neurological complications: meningoencephalitis, myelopathy, cerebral toxoplasmosis.

Risks of highly active antiretroviral therapy treatment to the pregnancy

The benefits of treatment are significantly greater than the risks. However, there is a documented increased risk of preterm labour for women on triple therapy.

Management

- HIV infection is a chronic health and potential social problem for the mother and newborn. Without intervention, the risk of mother to child transmission is 30-50% (depending on the viral load).
- All women who are HIV positive are advised to give birth in a healthcare facility.
- The option of delivery via Caesarean section should be discussed.

[!] Avoid instrumental delivery, if possible, for HIV positive women.

- If a woman presents with preterm prelabour rupture of the membranes, a judgement must be made as to whether the risks of prematurity outweigh the risks of vertical transmission if the woman remains pregnant. Women with an undetectable viral load (<20 copies/ml) should generally be advised to continue with the pregnancy and await the spontaneous onset of labour, provided there is no sign of ascending bacterial infection leading to chorioamnionitis. Antibiotic prophylaxis should be provided per the usual protocol.
- Women with breech presentation at 36 weeks can be offered external cephalic version.

Tuberculosis

Key points

Tuberculosis is a public health problem and is among the three leading causes of death among women aged 15-45 years in high burden areas. The incidence of tuberculosis in pregnancy, though not readily available, is expected to be as high as in the general population. TB may be asymptomatic and screening for TB during pregnancy is not often available. Congenital TB though rare, is associated with high perinatal mortality.

Women with HIV/AIDS, due to weakened immune systems have a much higher risk of developing TB. Interventions aimed at integrating passive TB screening in other settings, such as antenatal clinics have proven to be acceptable. Active screening for TB among women who are HIV positive can reveal a significant number of women with undiagnosed TB.

Microbiology

Mycobacterium tuberculosis, is an aerobic, non-spore-forming, non-motile bacillus. Almost all TB infections are caused by inhalation of infectious particles aerosolized by coughing, sneezing and talking.

TB in pregnancy

TB affects almost every organ in the body, but the usual site of the disease is the lungs, accounting for more than 80% of tuberculosis cases. The pattern of the infection in HIV positive women may, however, be different, with increasing trends towards extrapulmonary spread. The exact incidence of tuberculosis in pregnancy is not readily available in many countries due to many confounding factors.

Pregnancy itself does not lead to progression of TB. The diagnosis of tuberculosis in pregnancy can be more challenging, as some symptoms may initially be ascribed to the pregnancy, for example, weight loss associated with TB may be masked by the normal weight gain in pregnancy. The worst prognosis is in women in whom a diagnosis of advanced disease is made in the puerperium as well as those with HIV co-infection. Failure to comply with treatment also worsens the prognosis.

Late diagnosis is an independent factor, which may increase obstetric morbidity about fourfold, while the risk of preterm labour may be increased nine-fold. In settings where the TB prevalence in the general population is 100/100,000 population or higher, systematic screening for active TB should be considered for pregnant women as part of antenatal care. Systematic screening is defined as the systematic identification of people with suspected active TB in a predetermined target group, using tests, examinations or other procedures that can be applied rapidly.

Diagnosis of TB in pregnancy

It is important to consider TB in all women with chronic cough and/or who have recently visited areas endemic with tuberculosis and/or who have a family member with a chronic cough or diagnosis of TB.

Symptoms of TB include:

- Chronic cough (>2-3 weeks' duration)
- Productive cough
- Blood noted on coughing (haemoptysis)
- Night sweats
- Night fever
- Weight loss

There are a number of ways in which TB can diagnosed and confirmed. These include:

- Microscopic examination and culture
- Mantoux or tuberculin test
- Chest x-ray
- GeneXpert

Microscopic examination

Microscopic examination of sputum for acid-fast bacilli is the cornerstone of routine laboratory diagnosis of TB in pregnancy. Three samples of sputum are obtained. Staining for acid-fast bacilli is done using the Ziehl-Neelsen, fluorescent, Auramine-Rhodamine, and the Kinyoun techniques. Light-emitting diode fluorescent microscopy has recently been introduced to improve diagnosis.

Culture

The traditional culture on Lowenstein-Jensen's medium may take 4-6 weeks to obtain a result. This may, however, still be useful in cases of diagnostic doubts and management of suspected drug-resistant tuberculosis.

Mantoux or Tuberculin Test

In pregnant women with signs and symptoms suggestive of TB, a tuberculin skin test can be carried out. This is a safe and sensitive test in pregnancy. A single-needle intradermal injection of 0.1 mL of purified protein derivative (5 Tuberculin units) is administered, and the skin reaction is analysed 48-72 hours later, based on the largest diameter of the indurations developed.

False-positive results may be obtained in individuals who had previously been vaccinated with the Bacillus Calmette-Guérin vaccine, those with previously treated tuberculosis, as well as in people with infection from another mycobacterium species. False negatives on the other hand are commonly due to a compromised immune system and technical errors. Newer diagnostic tools are now available to facilitate diagnosis, including the GeneXpert, which has been endorsed by the WHO.

GeneXpert Test

The GeneXpert test is a new molecular test for TB which diagnoses TB by detecting the presence of TB bacteria, as well as testing for resistance to the drug Rifampicin. The test detects the DNA in TB bacteria. It uses a sputum sample and can give a result in less than two hours. it can also detect the genetic mutations associated with resistance to the drug Rifampicin. Many countries now have GeneXpert diagnostic facilities.

The main advantages of the test are reliability when compared to sputum microscopy and the speed of getting the result when compared with culture. For diagnosis of TB, although sputum microscopy is both quick and cheap, it is often unreliable. It is particularly unreliable when women

are also HIV positive. Although culture gives a definitive diagnosis, to get the result usually takes a much longer time (weeks) compared to the GeneXpert test (<2 hours).

Chest x-ray
A chest x-ray with abdominal lead shield may safely be done during pregnancy without concern for fetal health.

Possible findings:
- Infiltrate or consolidation
- Cavity lesions
- Nodules with poorly defined margins
- Pleural effusion
- Hilar or mediastinal lymphadenopathy

Treatment of TB

Commonly used anti-TB drugs are not teratogenic and safe in pregnancy.
- Rifampicin, Isoniazid and Ethambutol are the first line drugs.
- Pyrazinamide use in pregnancy is gaining popularity.
- Isoniazid preventive therapy is aimed at reducing the infection in HIV positive pregnant women.
- Babies born to women with TB who are also HIV positive should be commenced on INH prophylaxis for six months, after which babies are vaccinated with Bacillus Calmette-Guérin if they test negative.

Untreated TB represents a far greater hazard to a pregnant woman and her fetus than treatment of the disease. Treatment is achieved with directly observed therapy. This therapy entails the use of combination therapy for at least 6 months. Depending on the combination of anti-TB agents that are available, this includes isoniazid and rifampicin compulsorily, supported by ethambutol and pyrazinamide. For women with drug-susceptible TB and good drug adherence, these regimens will cure around 90% of TB cases. Treatment is done on an outpatient basis, unless otherwise indicated. The use of these first-line anti-TB drugs in pregnancy are considered safe for the woman and baby.

Isoniazid
Isoniazid (INH) is safe during pregnancy even in the first trimester, although it can cross the placenta. Pyridoxine supplementation is recommended for all pregnant women taking INH at a dose of 50mg daily.

Rifampicin
This is also believed to be safe in pregnancy, though in an unknown proportion of cases, there may be an increased risk of haemorrhagic disorders in the newborn.

Ethambutol
The retrobulbar neuritis that may complicate the use of this drug in adults generated the fear that it may interfere with ophthalmological development when used in pregnancy but this has not been demonstrated when the standard dose is used.

Pyrazinamide
The use of pyrazinamide in pregnancy was previously avoided by healthcare providers due to unavailability of adequate data on its teratogenicity. Presently, many international organisations recommend its use and there are no reports of significant adverse events in pregnant women and it used as part of the standard regimen in many countries. Pyrazinamide is particularly indicated in women with tuberculous meningitis in pregnancy, HIV coinfection, and suspected Isoniazid resistance.

Streptomycin
The drug has been proven to be potentially teratogenic throughout pregnancy. It causes fetal malformations and eighth-nerve paralysis, with deficits ranging from mild hearing loss to bilateral deafness. Many countries do not use this drug in pregnancy.

Multidrug-Resistant TB

Pregnant women with multidrug-resistant TB have a less favourable prognosis. They may require treatment with second-line drugs including:

- Cyclomerize
- Ofloxacin
- Amikacin
- Kanamycin
- Capreomycin
- Ethionamide

The safety of these drugs is not well-established in pregnancy but ethionamide is not recommended for use in pregnancy. Individualised treatment regimens using various combinations of these second line anti-TB agents have been used in pregnant women with no adverse obstetric outcome. The recommendations for treatment of women who are pregnant and have multi drug resistant TB are expected to change as experience and knowledge in the management of the condition increases.

Effect of TB on the developing baby

Congenital TB is a rare complication of in utero TB infection. Congenital tuberculosis may be because of haematogenous spread through the umbilical vein to the fetal liver or by ingestion and aspiration of infected amniotic fluid. A primary focus subsequently develops in the liver, with involvement of the peri-portal lymph nodes. The tubercle bacilli infect the lungs secondarily, unlike in adults where over 80% of the primary infections occur in the lungs.

Congenital tuberculosis may be difficult to distinguish from other neonatal or congenital infections from which similar symptoms may occur in the second to the third week of life.

These symptoms include:

- Hepato-splenomegaly
- Respiratory distress
- Fever
- Lymphadenopathy

The possibility of postnatal transmission must be excluded by a thorough investigation of all contacts, including hospital staff and attendants. Up to 50% of newborn babies with congenital TB may die, especially in the absence of treatment.

[!] Pyridoxine deficiency may cause seizures in the newborn.

In the absence of evidence of congenital TB, isoniazid (10 mg/kg/day) should be commenced at birth and continued for six months. Clinical or radiological features of active tuberculosis and a positive tuberculin skin test are indications for a full course of anti-TB treatment. The tuberculin skin test and chest x-rays are done at six weeks, twelve weeks, and six months. The baby is vaccinated with the Bacillus Calmette-Guérin vaccine at six months if these tests are negative. The baby is, however, changed to multiple drug therapy if any of these tests turn positive during the period of monitoring.

HIV and TB co-infection in pregnancy

HIV and TB often occur as coinfections. Treatment is complicated by the challenges of adherence, polypharmacy and the overlapping side effects of anti-TB and antiretroviral drugs.

The spectrum of antiretroviral drugs available for use in pregnancy is limited. Efavirenz is contraindicated before the thirteenth week of gestation, while the risk of toxicity from the use of didanosine and stavudine is significantly increased in pregnancy. Rifampicin may cause a reduction in the serum concentration of Efavirenz, though, increasing the dose of efavirenz does not result in any significant outcome.

Nevirapine, which is an alternative to the use of efavirenz, also exhibits some drug interaction with rifampicin. Rifampicin may lead to the reduction of serum concentration of nevirapine by as much as 50%. To circumvent this problem, rifabutin, another rifamycin that is as effective as rifampicin in the treatment of tuberculosis may be used, as the drug has less effect on the CYP3A system that metabolizes nevirapine.

Generally, there is a lack of studies and data on how pregnancy may affect the interactions. Caution is, therefore, of great importance when managing pregnant women with both TB and HIV. National guidelines, where available, available should be followed.

Prevention of Tuberculosis

The Bacillus Calmette-Guérin vaccine has been incorporated into the national immunization policy of many countries, especially the high burden countries, thereby conferring active immunity from childhood. Isoniazid preventive therapy is aimed at reducing the risk of TB in HIV positive pregnant women based on evidence and experience and it has been concluded that pregnancy should not be a contraindication to receiving Isoniazid preventive therapy.

Malaria

Definition

Malaria is caused by protozoa of the genus Plasmodium, which is transmitted to humans through the bite of an infected female Anopheles mosquito.

- Plasmodium falciparum is the dominant parasite mainly responsible for over 90% of malaria cases and all the severe forms of the disease.
- The most vulnerable groups are under-five year old children and pregnant women, especially if CD4 is low secondary to infection with HIV.

The symptoms and complications of malaria in pregnancy vary according to malaria transmission intensity in the given geographical area, and the individual's level of acquired immunity.

High-transmission settings

In high-transmission settings, where levels of acquired immunity tend to be high, Plasmodium falciparum infection is usually asymptomatic in pregnancy. Yet, parasites may be present in the placenta even in the absence of documented peripheral parasitaemia.

In high-transmission settings, the adverse effects of Plasmodium falciparum infection in pregnancy are most pronounced for women in their first pregnancy.

Low-transmission settings

In low-transmission settings, where women of reproductive age have relatively little acquired immunity to malaria, malaria in pregnancy is associated with an increased risk of severe malaria. In such settings, malaria affects all pregnant women, regardless of the number of times they have been pregnant.

Prevention of malaria in pregnancy

The following interventions are recommended for the prevention of malaria during pregnancy:

- Use of long-lasting insecticide-treated bednets
- In all areas with moderate to high malaria transmission intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine, as part of antenatal care
- Prompt diagnosis and effective treatment of malaria infections

Intermittent preventive treatment for malaria in pregnancy

- All pregnant women in areas of moderate-to-high malaria transmission should receive intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine at each scheduled antenatal care contact.
- The first dose should be given as early as possible in the second trimester of pregnancy (preferably after quickening). Sulfadoxine-pyrimethamine should not be given in the first trimester of pregnancy.
- The sulfadoxine-pyrimethamine doses should be given at least one month apart and the last dose can be administered up to the time of delivery without safety concerns. Every woman should have at least 3 doses.
- Intermittent preventive treatment in pregnancy should be administered as directly observed therapy of three tablets sulfadoxine-pyrimethamine (each tablet containing 500mg/25mg sulfadoxine-pyrimethamine).
- Sulfadoxine-pyrimethamine can be given either on an empty stomach or with food.

- Folic acid at a daily dose of 0.4 micrograms daily can be safely used with sulfadoxine-pyrimethamine. Any dose equal to or above 5mg should not be given together with sulfadoxine-pyrimethamine as this counteracts its efficacy as an antimalarial

Long-lasting insecticide-treated bednets

- Each pregnant woman living in a malaria risk area should receive a free long-lasting insecticide-treated bednets at the first antenatal contact.
- Each pregnant woman is shown how to hang the long-lasting insecticide-treated bednets and encouraged to use the net each night during her pregnancy and thereafter.

Provision of prompt diagnosis and treatment of fever due to malaria

- Test every pregnant woman who has a fever with a rapid diagnostic test kit for malaria
- Give antimalarial drugs to women who are confirmed to have malaria

Health education/counselling

- Counsel the woman on the importance of completing the course of medication
- Seek treatment in case of febrile illness, encourage to have a RDT and avoid obtaining treatment over the counter, which may be inadequate
- Regular long-lasting insecticide-treated bednet use

Clinical features of malaria in pregnancy

- Uncomplicated malaria
  - □ Fever (Temperature 37.5°C or more)
  - □ Chills/rigors
  - □ Headache
  - □ Joint pains
  - □ General malaise

Severe malaria

In addition to the above symptoms and signs, the following may be present in severe malaria:

- Generalized convulsions
- Altered consciousness (change of behaviour, confusion, delirium, coma persisting for over 30 minutes after convulsion)
- Severe anaemia – Hb <5g/dl
- Hypoglycaemia (blood glucose <2.2mmol/L or <40mg/dl)
- Spontaneous unexplained bleeding
- Haemoglobinuria (dark urine)
- Acute renal failure (failure to make urine or making very little quantity of urine)
- Shock or circulatory collapse (cold limbs, weak rapid pulse)
- Jaundice
- Acute pulmonary oedema or difficulty in breathing (adult respiratory distress syndrome)

Diagnosis

- Microscopy of a thick and thin blood film
  - □ Thick blood film is more sensitive to detecting parasites
  - □ Thin film helps to identify parasite species
- Rapid diagnostic test

Treatment of Malaria Infection

Uncomplicated malaria

First trimester:

- Treat pregnant women with uncomplicated malaria in the first trimester of pregnancy with oral quinine plus clindamycin for seven days.
- If quinine is not available or the adherence with a seven-day treatment of oral quinine plus clindamycin cannot be guaranteed, treat with artemisinin-based combination therapy (ACT) (artemether-lumefantrine (AL) first option with artesunate-amodiaquine (AS+AQ) as alternative).

Second and third trimester of pregnancy:

- Treat pregnant women in the second and third trimester presenting with uncomplicated malaria as non-pregnant adults using AL or AS+AQ as alternative.
- Give antipyretics e.g. paracetamol together with the malaria treatment.

Severe malaria

- Admit any woman with severe malaria as an inpatient
- Quinine should be given IV or IM until the woman can take oral quinine
- If in a primary level facility, give initial dose of quinine IM and refer to secondary level facility
- Intravenous fluids, preferably 5% dextrose
- If altered consciousness, give boluses of 10% as can be severely hypoglycaemic, repeat as necessary
- Test glucose frequently (hourly)
- Antipyretics – paracetamol
- Anticonvulsants if convulsions have occurred – magnesium sulphate
- Blood transfusion if Hb is <7g/dl

Chapter 9: Obstetric complications

In this chapter, you will find information about:

- Hypertensive disorders of pregnancy
- Antepartum haemorrhage
- Abnormally large uterus
- Intrauterine growth restriction
- Preterm birth
- Malpresentation
- Multiple pregnancy
- Induction of labour

Hypertensive disorders of pregnancy

Hypertensive disorders of pregnancy are a cause of severe morbidity, long term disability and death among both women and their babies. Nearly one tenth of all maternal deaths are associated with hypertensive disorders of pregnancy. Among the hypertensive disorders that complicate pregnancy, pre-eclampsia and eclampsia are the major causes of maternal and perinatal mortality and morbidity and are among the leading causes of maternal and perinatal morbidity and mortality. In LMIC, hypertensive disorders were the second most common obstetrical cause of stillbirths and early neonatal deaths.

Definitions of Hypertension during Pregnancy

- **Pre-existing hypertension**: This is hypertension diagnosed before or in the first 20 weeks of pregnancy with a blood pressure measurement of ≥140/90mmHg.
- **Pregnancy-induced hypertension**: Diastolic blood pressure >90mmHg on two consecutive readings after 20 weeks' gestation.
- **Pre-eclampsia**: It is clinically defined by hypertension (>140/90mmHg) on two consecutive readings after 20 weeks' gestation with significant proteinuria (≥2 ++ on urinalysis, ≥0.3g/L), with or without clinical symptoms
- **Severe pre-eclampsia**: Blood pressure >90mmHg as above; proteinuria 3+ or more; and one or more signs or symptoms such as headache, blurring of vision and right upper abdominal pain
- **Eclampsia**: Blood pressure >90mmHg as above; proteinuria >2 ++; convulsions; other signs and symptoms of severe pre-eclampsia

[!] Be aware of the risk of seizures following delivery, many eclampsia cases occur postnatally. This risk is highest 48 hours postpartum, but it can occur at any time up to 4 weeks after delivery.

Management of pregnancy induced hypertension

Pregnancy induced hypertension is a common complication of pregnancy. Any woman who presents with elevated blood pressure should have a full assessment to establish the diagnosis and to exclude pre-eclampsia.

- Baseline bloods (liver function tests, full blood count, urea and electrolytes, uric acid) and urine test.
- Once the diagnosis of pregnancy induced hypertension (normal bloods, no protein or symptoms), is confirmed then women can be monitored.
- Monitoring throughout the pregnancy is important in women with pregnancy induced hypertension owing to an increased risk of developing eclampsia.
- The degree of monitoring will depend on the degree of hypertension from weekly in mild pregnancy induced hypertension (140-150/90-95mmHg) to three times a week if close to treatment levels.
- Women should be advised to attend their nearest healthcare facility if they develop any symptoms of pre-eclampsia or have any concerns about fetal movement.
- Consider hypertensives when diastolic blood pressures are persistently above 105mmHg (Table 9.1).
- Consider starting hypertensives before 28 weeks if diastolic blood pressure is greater than 90 (Table 9.1), aim for blood pressure <140/90mmHg.

Follow-up

- Blood pressure usually settles within six weeks of delivery
- If hypertension persists, consider essential hypertension
- Women with pregnancy induced hypertension are at increased risk of recurrence of pregnancy induced hypertension in future pregnancies and of hypertension in later life

Management of pre-eclampsia

If pre-eclampsia is mild and stable, the woman may be managed as an outpatient and regularly reviewed (at least twice weekly). If the woman lives far away from the healthcare facility and has no access to transport, she should be managed as an inpatient. Pre-eclampsia can progress rapidly and unpredictably from mild to severe pre-eclampsia and women should be counselled about signs and symptoms of pre-eclampsia. Delivery is the definitive management.

Women with new onset pre-eclampsia (>140/90mmHg) on 2 consecutive readings after 20 weeks' gestation with significant proteinuria (≥2 ++ on urinalysis) and have fetal effects (reduced fetal movements, or fetal growth) should be referred to the most appropriate healthcare facility for inpatient treatment.

- In women who are asymptomatic, have mildly raised blood pressure not requiring treatment, and no evidence of organ dysfunction (pregnancy induced hypertension bloods are normal) and with a normally grown fetus, expectant management is preferred.
- Consider starting anti-hypertensives if blood pressure is persistently >140/90mmHg (Table 9.2).
- Anti-hypertensives control blood pressure but do not stop the disease process.

Fetal monitoring

- Maternal monitoring of movements is subjective but should be taken seriously
- Fortnightly growth measurements by ultrasound scan (if available)
- Weekly liquor volume and umbilical artery doppler (if available)
- If delivery is anticipated before 36 weeks, then consider steroids for fetal lung maturity (Table 9.5)

Delivery

- The decision to deliver is multi-factored and includes all aspects of maternal and fetal wellbeing, including past obstetric history and current gestation
- Consider induction of labour at term if the cervix is favourable
- Delivery should be expedited in women who:
  - □ Have signs symptoms of pre-eclampsia or HELLP syndrome
  - □ Have uncontrollable blood pressure whilst on antihypertensives
  - □ Static fetal growth, reduced fetal movements or oligohydramnios

Table 9.1 Use of hypertensive drugs

Drug	Dose and route
Labetalol	100mg orally two times a day, increasing to 200mg three times a day
Nifedipine	10mg two times a day, can increased to 40mg two times a day
Methyldopa	250mg two times a day up to 1g three times a day

[!] If it is not possible to monitor a woman with mild pre-eclampsia as an outpatient, she should be admitted to the healthcare facility for close monitoring and treatment.

Symptoms and signs of severe pre-eclampsia or impending eclampsia include:

- Severe headache (especially frontal)
- Altered mental state/drowsiness
- Visual disturbances (e.g. blurred vision, flashes of flight)
- Epigastric pain
- Hyper-reflexia (detected with use of a patella hammer)

Classification of pre-eclampsia/eclampsia

Pre-eclampsia is classified as mild, and severe. The clinical picture of the different stages is shown in Table 9.2 below.

Table 9.2 Clinical picture and symptoms of Pre-eclampsia and Eclampsia

Finding	Mild Pre-eclampsia	Severe Pre-eclampsia	Eclampsia
Diastolic blood pressure	Absolute level is >90 but <100	Absolute level is >100	As in severe pre-eclampsia plus fits
Proteinuria	Trace or 1+	2+ or greater	
Generalized oedema including face and hands	Absent	Persistently present	
Headache	Absent	Present	
Visual disturbance	Absent	Present	
Epigastric pain	Absent	Present	
Oliguria	Absent	Present	

The differential diagnosis of eclampsia includes:

- Epilepsy
  - History of epilepsy
  - No elevated blood pressure
  - No proteinuria
- Cerebral malaria
  - Fever
  - Positive malaria blood slide
  - No proteinuria
  - No elevated blood pressure
- Meningitis
  - Headache
  - Fever
  - Stiff neck
  - Positive lumbar puncture
  - No proteinuria
  - No elevated blood pressure

Complications of pre-eclampsia and eclampsia include:

- Placental abruption
- Renal insufficiency or failure
- HELLP syndrome (Haemolysis, Elevated Liver enzymes and Low Platelet count)
- Intracranial haemorrhage
- Disseminated intravascular coagulation
- Pulmonary oedema

Management of a woman with an eclamptic fit

[!] Eclampsia is an obstetric emergency.

While waiting for transport and referral and to stabilise the woman:

- Place the woman in the left lateral 'recovery' position to prevent aspiration.
- Note the time and duration of fit.
- Commence medication as per Table 9.3
- Insert Foley catheter, monitor urine output and maintain strict fluid balance chart.
- Restrict fluids to 80ml/hour (26 drops/min) to prevent maternal fluid overload.
- ADMIT as soon as possible to a healthcare facility.

Table 9.3 Use of anticonvulsant drugs

Drug	**Dose and route**	**Continuing dose**	**Maximum dose**	**Precautions and contraindications**
Magnesium sulphate	Loading dose of 4g should be given IV over 5 minutes	IV infusion of 1 g/hour maintained for 24 hours	Recurrent seizures should be treated with a further dose of 2-4g given over 5 minutes	Magnesium toxicity should be observed for and treated with calcium gluconate
Diazepam	0.15-0.25mg per kg (usually 10-20mg) is given by IV injection	The dose can be repeated if necessary after 30 to 60 minutes.	Maximum total dose 3mg per kg over 24 hours	Severe or acute respiratory depression

These women will need follow-up and treatment postnatally (See Chapter 12 for more information).

Obstetric cholestasis

Definition

Obstetric cholestasis is a pregnancy specific condition characterised by pruritus without a rash, abnormal liver function tests and postpartum resolution.

It is a rare complication of pregnancy and is more common in the third trimester. Obstetric cholestasis is a multifactorial condition (genetic, endocrine and environmental factors are involved. It is more likely if there is a personal or family history of obstetric cholestasis.

Diagnosis

- Generally, there is a generalised pruritus, including the palms and soles of the feet without a rash. The itching is worse at night and disturbs sleep.
- Liver function tests and bile acids should be taken (if available). Abnormal bile acids are the most useful test in the diagnosis of obstetric cholestasis.
- In the event of abnormal liver function tests or bile acids, a number of investigations are undertaken to exclude other diagnosis:
  - Blood pressure and urinalysis to rule out pre-eclampsia
  - Viral hepatitis screen

Management

- Once obstetric cholestasis is diagnosed, liver function tests should be checked weekly
- Topical creams such as calamine lotion and aqueous cream with menthol may provide some relief
- Ursodeoxycholic acid is most commonly prescribed for use in the relief in pruritus in obstetric cholestasis.

Decision to deliver

- Obstetric cholestasis is associated with increased rates of spontaneous and iatrogenic prematurity, fetal distress and intrauterine death
- Importance of maternal monitoring of fetal movements should be explained, and women advised to attend for fetal assessment if concerns arise
- The decision to deliver should be based upon the diagnosis and gestation. Delivery at 37-39 weeks is commonly advised owing to the risk of stillbirth

Antepartum haemorrhage

Definition

Antepartum haemorrhage is any vaginal bleeding from the genital tract after 24 weeks' gestation.

Causes

- Placental abruption
- Placenta praevia
- Local and undetermined bleeding

Management of antepartum haemorrhage depends upon the cause, maternal and fetal condition, gestation and degree of bleeding. It is best to treat antepartum haemorrhage of unknown origin as small placental abruptions.

Local and undetermined bleeding

Cervical causes

Cervicitis, cervical polyps and rarely cervical carcinoma. A speculum examination should be performed on anyone who presents with bleeding (once placenta praevia has been excluded).

- Cervical polyps should be assessed postnatally, and removed if still present.
- If cervical carcinoma is expected, refer to a specialist.

Post-coital

This is a common presentation. Light painless bleeding from the cervix occurs secondary to sexual intercourse. It is usually noticed immediately after intercourse or when a woman next goes to the toilet.

- On speculum, a bleeding point may be seen. If confirmed post-coital bleed (i.e. painless spotting immediately after intercourse with bleeding point seen on cervix and placenta not low) then the woman should be discharged.
- If the cause is in doubt, then always consider abruption or placenta praevia and manage appropriately.

Genital infections

- Bleeding can be secondary to vaginal infection (thrush, bacterial vaginosis and trichomonas vaginalis) or cervical infections.
- Thrush is very common in pregnancy and can be diagnosed clinically on speculum (Chapter 5).

Placenta praevia

Placenta praevia occurs when the placenta is partially or wholly inserted into the lower segment of the uterus.

Classification

- **Minor placenta praevia**: the placenta is sited on the lower segment but does not cover the cervical os
- **Major placenta praevia:** the placenta covers the cervical os

Signs and symptoms

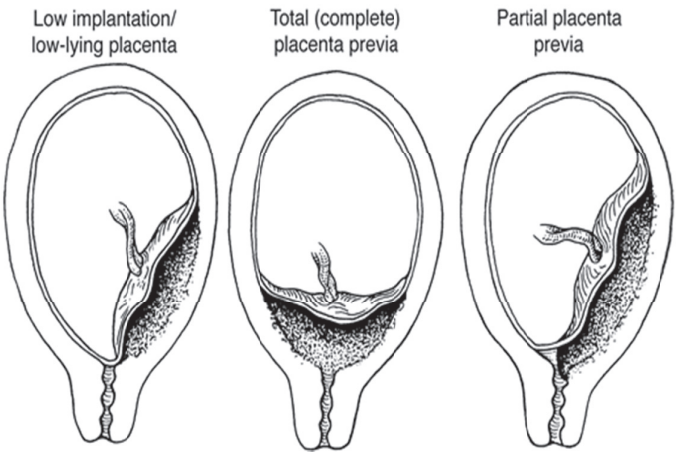
- Often bleeding is painless
- Bleeding is often unprovoked
- Women may present for the first time with bleeding in labour
- Bleeding can range from spotting with no maternal or fetal effect to life threatening bleeding and maternal shock
- No tenderness in the abdomen
- Soft and relaxed uterus
- Presenting part may be high or there may be abnormal presentation
- Fetal parts are easily palpable
- Fetal heart sounds are usually present

Management of placenta previa

Confirming the diagnosis

- If you suspect the woman has a placental previa, refer the woman to a hospital. Do not perform a vaginal examination.
- Where available, ultrasound can be done to confirm diagnosis and localise the placenta.
- The length of stay in hospital will depend on the amount of bleeding, gestation and degree of praevia.
- Women with major placenta praevia who have had previous bleeds in this pregnancy should be admitted to the healthcare facility in case of sudden heavy bleeding.
- Expectant management until 39 weeks is preferable to reduce prematurity.
- Women with major placenta praevia at term should have an elective Caesarean section at a secondary level facility that has access to blood products.

Figure 9.1 Classification of placenta praevia



Placental abruption

Placental abruption is the premature separation of a normally sited placenta from the uterus.

- **Revealed abruption**: blood from the placental separation moves to the cervix and causes vaginal bleeding.
- **Concealed abruption**: blood forms a retroplacental clot between the placenta and uterus with no vaginal bleeding. This can lead to little vaginal bleeding in a clinically shocked woman.

Diagnosis

- Women present with vaginal bleeding and pain and often in premature labour.
- Fetal heart rate abnormalities: tachycardia, bradycardia or absent fetal heart rate.
- With severe abruption, the uterus becomes woody hard and extremely painful to touch.
- In half of placental abruption cases, the women will be in labour, which makes it difficult to diagnose. Consider the diagnosis if there is bloodstained liquor and uterine hyper stimulation. There may also be signs of fetal distress.

Table 9.4 outlines the presenting signs and symptoms of antepartum haemorrhage and differential diagnosis.

Table 9.4 Differential diagnosis for antepartum haemorrhage during pregnancy

Presenting Symptom and/or Signs	Symptoms and/or Signs Sometimes Present	Probable Diagnosis
■ Bleeding after 24 weeks of gestation (may be retained in the uterus) ■ Intermittent or constant abdominal pain	■ Shock ■ Tense/tender uterus ■ Decreased/absent fetal movements ■ Fetal distress or absent fetal heart sounds	Placental abruption
■ Painless bleeding after 24 weeks of gestation	■ Shock ■ Bleeding may be precipitated by coitus ■ Relaxed uterus ■ Fetal presentation not in pelvis/lower uterine pole feels empty ■ Normal fetal condition	Placenta praevia
■ Bleeding (intra-abdominal and/or vaginal) ■ Severe abdominal pain (may decrease after rupture)	■ Shock ■ Abdominal distension/free fluid ■ Abnormal uterine contour ■ Tender abdomen ■ Easily palpable fetal parts ■ Absent fetal movements and fetal heart sounds	Ruptured uterus

Management women attending with acute bleeding

[!] Heavy vaginal bleeding is an obstetric emergency.

- Make a rapid evaluation of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature) and chart on an observation chart,
- If you suspect shock, begin treatment immediately and start a rapid IV infusion (Normal saline or Ringer's solution)
- Start iv fluids and arrange for immediate transfer and further management.
- Collect blood for grouping and cross-matching and check Hb

Abnormal fetal growth and wellbeing

One aim of antenatal care is to detect abnormalities of fetal growth and to ensure fetal wellbeing. It is important that healthcare providers can detect and manage abnormal fetal growth and presentations.

Large-for-dates

Definition

The uterine size is larger than is compatible with the gestational age.

Possible causes

- Incorrect estimated due date
- Large for gestational age (macrosomia)
- Multiple pregnancy
- Polyhydramnios

Management

- Verify the due date
- Perform ultrasound to check for macrosomia, polyhydramnios, multiple pregnancy and molar pregnancy (if available)
- Macrosomia is a postnatal diagnosis but if suspected antenatally (an estimated fetal weight of >4.5kg on ultrasound scan) an individualised plan should be made for birth

Polyhydramnios

Definition

Polyhydramnios is defined as an increase of the amniotic fluid volume in pregnancy and is associated with increased perinatal morbidity and mortality.

Incidence

Polyhydramnios is uncommon. Reported rates are influenced by variations in diagnostic criteria, i.e. the subjective volume of fluid where polyhydramnios is diagnosed, and the gestational age (preterm, term, or post term) at time of assessment. An underlying disease is only found in 17% of cases in mild polyhydramnios. In contrast, an underlying disease is detected in 91% of cases in moderate to severe polyhydramnios.

Common causes of polyhydramnios

- Gestational diabetes
- Fetal anomalies with disturbed fetal swallowing of amniotic fluid
- Viral infections in the woman including toxoplasmosis, syphilis, rubella

Diagnosis

- The diagnosis is obtained by ultrasound.
- Maternal gestational diabetes should be excluded.
- Maternal ToRCH screening is recommended where possible (ToRCH is Toxoplasmosis, Rubella, Cytomegalovirus, Herpes simplex and Other diseases such as HIV, syphilis and measles).

Management

- Screen for diabetes
- Monitor the pregnancy, let the woman deliver spontaneously, general guidance recommends induction only if this is clinically indicated.
- Mild polyhydramnios can be simply monitored and treated conservatively.
- Preterm labour is common due to overdistension of the uterus, and measures should be taken to minimise this complication. This includes regular antenatal checks and measurements of the uterus. Serial ultrasound scans should be carried out to monitor the amniotic fluid index and fetal growth by a specialist if available.

- Induction of labour should be considered if fetal distress develops. Induction by artificial rupture of the membranes should be controlled, performed by the most senior healthcare provider available with consent.
- Corticosteroids should be given to the woman antenatally if preterm delivery is imminent or considered. This helps to improve lung maturity.
- Delivery in a hospital is recommended.

Small-for-gestational age

Definition

Small-for-gestational age refers to a developing baby or newborn with a birth weight below a specific biometric or estimated weight threshold. The commonly used threshold is the 10th centile for estimated fetal weight or postnatal birth weight.

Small fetuses are divided into normal small, non-placenta-mediated growth restriction and intrauterine growth restricted. The incidence of small-for-gestational age fetuses in the population is approximately 7%. Intrauterine growth restricted fetuses form up to 15% of all small-for-gestational age fetuses in the population. This is different to newborns that are preterm who are small because of gestational age

Signs and symptoms

- Symphysis fundal height falls below expected rate for dates
- The woman reports her abdomen is ‘not growing’
- Oligohydramnios

Screening

- Methods of screening for the small-for-gestational age fetus in the second and third trimester are abdominal palpation and measurement of symphysis fundal height.
- Serial measurement of symphysis fundal height is recommended at each antenatal appointment from 24 weeks of pregnancy as this improves prediction of a small-for-gestational age newborn baby.

Diagnosis

- Ultrasound (if available)

Diagnosis of a small-for-gestational age fetus usually relies on serial ultrasound measurement of fetal abdominal circumference or estimation of fetal weight.

Management

- Distinguishing cause of lower than expected weight growth threshold
- Monitor wellbeing until timely delivery is indicated
- Serial ultrasound growth scans are indicated to monitor growth
- Women should be advised to report early if they notice changes in the usual pattern or diminished fetal movements

Intrauterine growth restriction

Definition

Intrauterine growth restriction refers to an antenatal disease process where a fetus fails to achieve its expected genetic potential. Intrauterine growth restriction can only be clinically diagnosed by ultrasound scan conducted by a specially trained healthcare provider.

Signs

- Symphysis fundal height lower than gestational age
- Uterine size appears and feels smaller than expected
- The woman reports that "the baby is not growing"

Screening

- Early diagnosis of Intrauterine growth restriction and prompt institution of management measures
- Precise estimation of gestational age early in pregnancy, using an ultrasound scan (if available)
- Presence of maternal conditions known to be associated with intrauterine growth restriction

Diagnosis

- Serial ultrasound measurement of fetal biometry and amniotic fluid volume (if available)

Management

- Monitor fetal wellbeing until timely delivery is indicated.
- Serial ultrasound growth scans are indicated to monitor growth (if available).
- Women should be advised to report early if they notice changes in the usual pattern or diminished fetal movements.
- Confirm gestational age, if pregnancy dating was not done before the 20th week.
- If the fetus is <34 weeks, give corticosteroids for lung maturity and, if it becomes necessary because there are signs that the fetus is compromised, deliver 48 hours after the first dose of the corticosteroid (Table 9.5).
- Appropriately treat any condition that may be causing the intrauterine growth restriction, e.g. severe anaemia, chronic malaria.
- Carefully plan the time for and appropriate mode of delivery (Caesarean section or induction of labour depending on individual case).

Prelabour rupture of membranes

Prelabour rupture of membranes occurs 15% of all pregnancies. Women are more likely to progress to spontaneous labour within 24-48 hours of prelabour rupture of membranes.

Signs and symptoms

- Sudden gush of fluid, soaking the clothes. Sometimes only dampness of underwear noted, can be mistaken for urinary incontinence
- Abdominal pain, contractions
- Mild pyrexia, generally feeling unwell, abnormal vaginal discharge
- Vaginal bleeding
- Dysuria
- Cord prolapse (this is an obstetric emergency and required emergency delivery of baby).

Examination of a woman with prelabour rupture of membranes

- Take vital signs (temperature, pulse, blood pressure and fetal heart rate) and document on an observation chart.
- Abdominal: Tender abdomen in the presence of abruption or infection. Contractions palpated if threatened or actual preterm labour
- Perform head to toe examination (including obstetric examination).
  - □ Evaluate the fetal movement, heartbeat and uterine contractions
  - □ Determine the baby's presentation and lie
  - □ Determine gestational age
- The woman should be advised to wear a pad and the healthcare provider can check if it is stained with amniotic fluid.
- There is no reason to perform a speculum examination with a definite history of prelabour membrane rupture at term.
- Women with an uncertain history can be offered a speculum examination to determine whether their membranes have ruptured. If liquor not seen, ask the woman to cough as it may cause a trickle through the cervix.
- Do not perform a digital vaginal examination as it increases the risk of intrauterine infection.

Management

- Fetal movement and heart rate should be assessed at initial contact and then every 24 hours following rupture of the membranes while the woman is not in labour, and the woman should be advised to report immediately any decrease in fetal movements.
- Women can be informed about the benefits and risks of induction and be offered induction of labour at 24 hours after membrane rupture if not in labour by that time (women can be advised to report to the healthcare facility immediately if they have any change in colour or smell in the vaginal discharge or have a fever).
- If the amniotic fluid is stained with meconium or the woman is a known carrier of Group B streptococcus, induction of labour can be offered immediately.
- If the period between membrane rupture and labour is greater than 24 hours, then the woman should be advised to stay in hospital for at least 12 hours after delivery (to allow observation of herself and the newborn).
- If there is no sign of infection in the woman or newborn, antibiotics will not be given to the woman or baby.
- If there is evidence of infection in the woman, a full course of broad spectrum intravenous antibiotics can be prescribed (Ampicillin 2g IV 6 hourly and Metronidazole 500mg IV 8 hourly).

Preterm prelabour rupture of membranes

Definition

Preterm prelabour rupture of membranes is a condition in which spontaneous rupture of membranes occurs before 37 completed weeks of pregnancy and at least one hour before the onset of labour.

Incidence

Preterm prelabour rupture of membranes is uncommon (<3% of pregnancies); however, it contributes to over a third of preterm births. It varies considerably between different areas due to different population risk factors. It precedes about 30-40% of spontaneous preterm labour. A third of women with preterm prelabour rupture of membranes give birth within 48 hours and half of cases within 7 days.

Factors associated with preterm prelabour rupture of membranes

- Uterine over-distension as in multiple pregnancy, polyhydramnios
- Cervical incompetence/short cervix
- History of preterm birth
- Trauma e.g. road traffic accident
- Intrauterine death
- Chorioamnionitis

Diagnosis

Diagnosis of preterm prelabour rupture of membranes is usually made on the basis of maternal history, physical examination, and ultrasound examination. On admission note and document:

- Time of preterm prelabour rupture of membranes
- Type and colour of fluid loss
- Amount of fluid loss
- Signs of infection including 'offensive smelling' vaginal discharge, uterine tenderness, maternal fever, and fetal tachycardia
- Assess for a differential diagnosis: Leakage of urine, physiological vaginal discharge, bacterial infection
- Abdominal palpation: assess fetal size and presentation. Note any abdominal tenderness which may indicate infection

Investigations

- Low vaginal swab for microscopy and sensitivity
- Ultrasound examination for gestational age, fetal well-being, growth and estimation of amniotic fluid index (if available)
- Full blood count: Hb, white blood count (total and differential count)
- Erythrocyte sedimentation rate or C-reactive protein to monitor infection
- Urinalysis for microscopy and sensitivity

Management of preterm prelabour rupture of membranes

- Digital vaginal examination should be avoided unless the woman is in active labour or birth is imminent.
- Prior to viability (24-28 weeks' gestation) the decision to administer corticosteroids can be made following consultation between the healthcare provider and the parents.
- A single course of antenatal corticosteroids should be considered for administration to women with preterm prelabour rupture of membranes without signs of infection between viability and 36+6 weeks' gestation.
- If gestation is less than 34 weeks and in the absence of infection or complications and in circumstances when a course of corticosteroids has not been completed, tocolytics may be considered for threatened premature labour (if available).
- Broad spectrum antibiotic administration is recommended following preterm prelabour rupture of membranes to prevent infection and prolong the pregnancy in the short term, leading to a reduction in neonatal and maternal morbidity.
- It is the healthcare providers' decision as to when to deliver a preterm baby. This is dependent upon the gestation of the baby and maternal and fetal wellbeing.
- If expectant management continues >34 weeks, women should be advised of the increased risk for chorioamnionitis and the decreased risk of respiratory problems in the newborn baby.

Management for gestation <34 weeks

Admit to hospital for assessment and plan for delivery:

- Monitor drainage of liquor using a pad
  - □ Monitor fetal wellbeing
  - □ Monitor maternal pulse and temperature every four hours and document on an observation chart
  - □ Uterine tenderness by abdominal palpation
  - □ The woman should be commenced on a course of erythromycin 250mg four times a day for 5 days
- If there is evidence of chorioamnionitis, commence treatment (Table 9.5).
- Preterm birth may occur in cases of spontaneous onset of labour or birth may need to be expedited in case of fetal distress.
  - □ In cases of extreme prematurity or severe fetal distress, Caesarean section is the preferred mode of delivery.

Management for gestation 34-37 weeks

Active management is provided: Assess for fetal well-being and determine best mode of delivery. If labour does not set in spontaneously within 48 hours, induce labour or perform a Caesarean section, if there is an indication.

Table 9.5 Use of corticosteroids

Drug	Dose and route
Betamethasone	12mg IM once a day for 2 days (24 hours apart)
Dexamethasone	6mg IM twice a day for 2 days (12 hours apart)

Preterm birth

Definition

Preterm labour is defined as the occurrence of regular uterine contractions that produce progressive effacement and dilatation of the cervix before 37 completed weeks of pregnancy.

Incidence

Globally, the incidence of preterm labour continues to be about 10% of all live births. Preterm birth is the cause of at least 50% of stillbirths and neonatal deaths.

Predisposing factors

- Preterm prelabour rupture of membranes
- Chorioamnionitis
- Uterine over-distension as in multiple pregnancy, polyhydramnios
- Pre-eclampsia and eclampsia
- Systemic febrile infections
- Cervical incompetence/short cervix
- Previous preterm birth

Management of preterm labour

Conservative management

This is recommended if the cervix less than 2cm dilated and includes:

- Bed rest
- Administer corticosteroids to the woman to improve fetal lung maturity and chances of neonatal survival (Table 9.5)
- Use of tocolytics to relax the uterine muscles to allow corticosteroids to work and to transport the woman to a healthcare facility where there is a special care baby unit
  - Nifedipine, 20mg initial dose and then 10-20mg 4-8 hourly
- Treat any underlying cause of preterm labour

Active management

This is recommended if the cervical dilatation is more than 2cm or there is fetal distress or intrauterine death. It involves the following:

- Administer corticosteroids in anticipation of preterm delivery. Contraindications to this treatment are maternal infection, hypertension, maternal heart disease or rupture of the membranes.
- Monitor labour in the usual manner.

[!] Premature babies are more susceptible to sepsis, hypothermia and hypoglycaemia.

Malpresentation

The presenting part of the fetus is the part which is lowest in the uterus. In most cases, this is the head (cephalic). Breech presentation, transverse, oblique and unstable lie can all occur at term and are associated with specific risks.

Breech presentation

Definition

A breech presentation is the fetal position that leads to the feet or the buttocks presenting first. Approximately 3% of all term pregnancies will be breech presentation.

Types of breech presentations

- Frank breech: the legs are flexed at the hip and extended at the knee
- Complete breech: the legs are tucked in and the fetus is in a crouching position
- Incomplete (footling) breech: one or both feet present first, with the buttocks higher up

Figure 9.2 Types of Breech

Frank breech **Full breech** **Single footling breech**

Diagnosis

Although a breech presentation can be diagnosed through palpation and confirmed using ultrasound, the exact type of breech presentation may not be clear until during labour, when vaginal examinations allow a more precise diagnosis to be made, especially as the cervix dilates and allows direct palpation of the presenting part of the fetus.

Management

Before labour

External cephalic version may be offered, with the use of tocolytics to relax the uterus. This procedure is successful in 40% of nulliparous women, and 60% of multiparous women if performed after 38 weeks.

Labour

If breech presentation persists, preparations for delivery are made. Delivery should be in a healthcare facility with an experienced midwife or doctor.

Transverse, oblique and unstable lie

Definitions
Transverse: The fetus is lying sideways across the uterus with the head on one side and the buttocks on the other side.
Oblique lie: The head or breech is in one iliac fossa.
Unstable lie: The fetal lie and presentation continually change.

Examination
Transverse lie: the uterus may look wider than expected. Fetal parts felt laterally, and nothing palpated above or in the pelvis.
Oblique lie: fetal pole felt in the right or left iliac fossa with nothing above or in the pelvis. If a full bladder is suspected, voiding will often resolve the situation.
Unstable lie: different positions recorded in the last weeks of pregnancy.

Management
- Most abnormal lies will stabilise in a longitudinal position.
- Expectant management is reasonable.
- Identify any causes of abnormal lie (e.g. placenta praevia) as this will influence management and delivery.
- With abnormal presentation, limbs, cord, shoulder or back can be presenting, increasing the risk of cord presentation, cord prolapse and compound presentation.
- Consider inpatient management after 37-38 weeks while awaiting labour particularly if the woman lives far away from the healthcare facility.
- If the baby spontaneously settles in a cephalic presentation, the woman can await labour at home.
- If spontaneous version does not occur, external cephalic version can be tried.

[!] Always check the position of the placenta. In case of placenta praevia – external cephalic version is not possible and a Caesarean section must be planned at the correct time (>37 weeks).

External cephalic version

- This is a procedure carried out to turn babies lying in the breech, transverse or oblique presentation to a cephalic presentation.
- Ideally done at 36-37 weeks – the baby is less likely to turn back to breech or transverse lie at that gestation.
- The procedure is shown to reduce the number of breech presentations at birth and therefore reduce the Caesarean section rate for breech presentations.
- Ensure the procedure is explained to the woman and family if present and consent gained.

Contraindications

- Pre-eclampsia or pregnancy-induced hypertension
- Multiple pregnancy
- Oligohydramnios or ruptured membranes
- History of antepartum haemorrhage in this pregnancy
- Previous uterine surgery including previous Caesarean section
- Placenta praevia

Procedure

- A doctor or senior midwife needs to be present to perform the external cephalic version.
- In case of complications which require urgent Caesarean delivery, ensure that the theatre staff are prepared and the anaesthetist is on site.
- Insert IV cannula.
- Perform ultrasound for liquor volume, position and engagement, if available.
- Record woman's vital signs and the fetal heart rate.
- Administer 5mg Diazepam orally and 4mg Salbutamol orally.
- Wait one hour to ensure the medications have the desired tocolytic effect.
- Ensure the woman has emptied her bladder.
- Assist the women into a comfortable supine position.
- Recheck maternal vital signs and fetal heart rate.
- The foot of the bed can be elevated if necessary to help free the breech from the pelvis.
- One hip can be elevated with a wedge/pillow so that the woman's abdomen slopes in the direction in which the baby is being turned.
- Offer nitrous oxide (gas and air) if available for pain relief.
- With one hand on each pole and with flexion maintained on the head, the healthcare provider should attempt to make the fetus perform a forward somersault. If this is unsuccessful, a backwards somersault can be attempted.
- Do the procedure slowly allowing the uterus to stretch into the new shape as the baby turns over. If the woman shows signs of severe discomfort, abandon the procedure.
- Do not push on the uterus for more than 5 minutes at a time and leave 3 minutes between attempts
- Minimize attempts at turning the fetus to 2-3 times.

In following the procedure, auscultation of the fetal rate (+/- ultrasound) should be performed. Auscultation should be done initially every 5 minutes for 15 minutes then every 30 minutes for the next 2 hours, then hourly for the next 2 hours. If no abnormalities are detected after 4 hours of monitoring, the woman can be discharged home.

Please note:

- If persistent bradycardia occurs, the cord may be knotted – immediately turn back to breech.
- If abdominal pain or bleeding is present following the procedure, abruption of the placenta may have occurred.
- If the membranes rupture during the procedure, be aware of risk of cord prolapse if neither of the fetal poles is in the pelvis.

For any of the above complications, admit the woman for close observation and assess the need to perform emergency Caesarean section. If the fetus does not turn easily, the procedure should be abandoned and a further attempt made in 2-3 days.

Multiple pregnancy

Definition

Twins

A pregnancy where two babies are produced in the same pregnancy

- **Dichorionic twins:** Each baby has a separate placenta.
- **Monochorionic diamniotic twins:** Both babies share a placenta but have separate amniotic sacs.
- **Monochorionic monoamniotic twins:** Both babies share a placenta and amniotic sac.

Triplets

A pregnancy where three babies are produced.

- **Trichorionic triplets:** Each baby has a separate placenta and amniotic sac.
- **Dichorionic triamniotic triplets:** One baby has a separate placenta and two of the babies share a placenta. All three babies have separate amniotic sacs.
- **Dichorionic diamniotic triplets:** One baby has a separate placenta and amniotic sac and two of the babies share a placenta and amniotic sac.
- **Monochorionic triamniotic triplets:** All three babies share one placenta but each has its own amniotic sac.
- **Monochorionic diamniotic triplets:** All three babies share one placenta. One baby has a separate amniotic sac and two babies share one sac.
- **Monochorionic monoamniotic triplets:** All three babies share a placenta and amniotic sac.

Diagnosis

- Suspect when the uterus is large for dates or 2 or 3 fetal poles can be felt
- Confirm by ultrasound scan (if available)
- Determine chorionicity at the time of detecting twin and triplet pregnancies by ultrasound using the number of placental masses, the lambda or T-sign and membrane thickness (if available)

Management

- Clinical care for women with twin and triplet pregnancies should be provided by a specialist team, all of whom have experience and knowledge of managing twin and triplet pregnancies.
- Be aware that women with twin pregnancies have a higher risk of spontaneous preterm birth if they have had a spontaneous preterm birth in a previous single pregnancy.
- Do not use cervical length routinely to predict the risk of preterm birth.
- All women should be advised to deliver in a comprehensive emergency obstetric care centre.
- Women should be offered information and emotional support specific to twin and triplet pregnancies at their first visit and provide ongoing opportunities for further discussion and advice including: antenatal and postnatal mental health and wellbeing antenatal nutrition.
- The risks, symptoms and signs of preterm labour and the potential need for corticosteroids for fetal lung maturation
- Timing and possible modes of delivery, breastfeeding parenting.

Timing of birth

- **Monochorionic twin pregnancies**: elective birth from 36 weeks 0 days, after a course of antenatal corticosteroids has been offered
- **Dichorionic twin pregnancies**: elective birth from 37 weeks 0 days
- **Triplet pregnancies**: elective birth from 35 weeks 0 days, after a course of antenatal corticosteroids has been offered.

Induction of labour

Induction of labour is the artificial initiation of uterine contractions before their spontaneous onset. The expected outcome is cervical effacement and dilation and delivery of the baby.

Indications for induction of labour

Any condition needing early delivery for maternal or fetal benefit. Decisions should be made on an individual basis by the most senior healthcare provider in consultation with the woman

These conditions include:

- Deteriorating maternal health, cardiac, renal, malignant or auto-immune diseases
- Pre-eclampsia
- Intrauterine growth restriction
- Prelabour rupture of membranes at term
- Prolonged preterm ruptured membranes (> 48 hours)
- Suspected chorioamnionitis
- Post-term pregnancy (pregnancy exceeding a duration of 41-42 completed weeks)
- Intrauterine fetal death

Methods used to induce labour

The following methods can be used to induce labour, depending on the state of the cervix.

Membrane 'stretch and sweep'

Involves a digital vaginal examination and stretching of the cervix to reach the internal cervical os and perform a cyclical sweeping motion. It acts by releasing prostaglandins. Membrane sweeping should be offered to women after 40 completed weeks of pregnancy. Assess the cervix using Bishop's Score (Table 9.6) and document findings of vaginal examination.

Artificial rupture of membranes

Amniotomy is simple and cheap and requires little technology. The cervix should be assessed using the modified Bishop's score (Table 9.6).

There are risks of:

- Ascending genital tract infection
- Prolapse of umbilical cord, especially hindwater amniotomy.

Prostaglandins

Prostaglandins are administered in the form of a vaginal gel or a suppository. They are:

- Expensive non-invasive (no intravenous administration required)
- Vulnerable to uncertainty about the best dosage schedule
- Once introduced, difficult to retrieve

In summary, the potential complications of induction of labour include:

- Uterine hyper-stimulation/uterine rupture
- Postpartum haemorrhage
- Fetal distress (fetal monitoring is mandatory)
- Umbilical cord prolapse
- Abruptio placentae
- Iatrogenic prematurity
- Hyponatraemia secondary to excessive oxytocin infusion infection

[!] Misoprostol is an orally active prostaglandin. In most countries misoprostol is not licensed for labour induction, but its use is common because it is cheap and heat stable. If using oral misoprostol, the dose should be 20 to 25mcg in solution.

Oxytocin

To induce labour, oxytocin must be given by measured intravenous infusion, as per local policies. Induction of labour should be undertaken in a comprehensive emergency obstetric care centre. There is no role for a bolus dose infusion; this can be dangerous.

There are risks of:

- Hypertonus resulting in reduced fetal oxygenation
- Excessive stimulation resulting in rupture of the uterus (especially if previous uterine surgery/ Caesarean section).

Table 9.6 Modified Bishop's Score

	Rating			
Factor	**0**	**1**	**2**	**3**
Dilation (cm)	closed	1-2	3-4	>5
Length of cervix (cm)	>2	1-2	0.5	<0.5
Consistency	firm	average	soft	
Position	posterior	mid	anterior	-3
Station	-3	-2	-1/0	

The induction process:

- The Bishop's score is an indication of cervical favourability. It will inform the healthcare professional of the best way to undertake induction of labour. A score of >8 is associated with ability to process to the artificial rupture of the membranes and induction labour.
- The woman needs to be involved in the decision and her wishes respected. Every effort should be made to ensure she is aware of the process, risks and benefits involved.
- Women who require induction of labour should deliver in a healthcare facility able to provide comprehensive emergency obstetric care.

Chapter 10: Postnatal care for mother and newborn: first visit

In this chapter, you will find information about:
- Principles of postnatal care for mothers and babies
- Full assessment of both the mother and her baby after giving birth and at subsequent visits up to six weeks postnatally
- Screening for and management postnatal depression

Postnatal care

Care of the mother and her newborn after birth is known as postnatal care. Postnatal care provides a unique opportunity to provide a full comprehensive and holistic assessment of the mother and newborn. It aims to ensure the mother is healthy, capable of taking care of her newborn and is equipped with the information she needs to do so.

Definition

Care that is given after birth from the delivery of the placenta up to six weeks after birth.
- Early postnatal period – the first 24 hours after birth
- Late postnatal period – after 24 hours up to 6 weeks after birth

Both mother and newborn need to have a full check and assessment within one hour of birth as well as in the first 24 hours after birth. In most countries, after birth, the mother and her newborn are discharged before 24 hours.

Components of postnatal care

Childbirth and the time around childbirth is a social event that is often governed by cultural norms. Postnatal care is primarily about the provision of a supportive environment in which a mother, her newborn and family can begin their new life together. It is important to understand essential care that every woman and her newborn should receive, as appropriate to their needs, during the first 6 weeks after birth, based upon the best evidence available.

In addition, it is important that the healthcare provider is able to identify and manage potentially life-threatening complications. The major complications accounting for maternal deaths are:
- Severe bleeding
- Infections
- Pre-eclampsia and Eclampsia
- Complications from delivery

Purpose of postnatal care for the mother

For both mother and newborn:

- To provide care for the rapid restoration of the mother to optimum health
- To support initiation and establishment of exclusive breastfeeding
- To prevent complications occurring in the postnatal period in the mother or her newborn
- To identify and manage complications when these occur and refer if necessary
- To provide family planning advice and services
- To provide basic health education including nutrition to the mother

Rationale for postnatal care

Almost 50% of maternal deaths and 40% of newborn deaths occur during the first 24 hours after birth. It is estimated that globally 2.9 million babies die within 28 days of life. Around 22% of these deaths are caused by severe bacterial infections such as meningitis, sepsis, pneumonia and tetanus. If recognised and treated early, many of these deaths could be prevented. For these reasons, mothers are encouraged to remain in the healthcare facility for at least 24 hours following birth so that both mother and baby can be closely monitored. This also gives the mother a chance to rest. In some cultures, mothers must remain at home or in a special birthing house for 40 days.

Following birth, the mother can experience both physical ill-health but also significant psychological ill-health. For example, up to 20% of mothers suffer significant depression after birth.

In addition to the care given after birth, a minimum of three visits or consultations spread throughout the first six weeks is recommended for comprehensive postnatal care.

Number and timing of postnatal care visits

- Day three (within 48-72 hours of giving birth)
- Between days 7-14 after giving birth
- At six weeks after giving birth

Medical care after pregnancy

Women who have pre-existing conditions will continue under the care of specialist healthcare providers after pregnancy. If a woman is diagnosed with a medical condition in pregnancy, it is essential that she is aware of the condition, the treatment and care she will need to access in the future. It is important that there are good communication links between healthcare providers and that women are advised to attend for follow-up care when necessary.

[!] Women who have experienced complications during birth require additional care.

Immediate postnatal care – first 24 hours after birth

- For healthcare facility births, both mother and newborn need to be checked within one hour of birth, at 6 hours of birth and again before discharge from the healthcare facility.
- It is recommended that a woman is not discharged until breastfeeding is established.
- For home births, the assessment needs to be completed as soon as possible and within 24-48 hours.

Routine maternal postnatal care checks after birth

- Check and chart (on an observation sheet) all clinical observations immediately after birth and then an hour later.
- If these checks are within normal parameters, then routine (4-6 hourly) checks can commence.
- If any checks are abnormal, then guidance should be taken from an observation chart regarding escalation of observation and management.

Assessment

During the first postnatal assessment, it is important that the healthcare provider:

- Explains who they are and what they will do
- Takes a full history
- Offers screening for all types of ill-health (physical, mental) and social problems to enable early recognition and prompt effective management and referral if required
- Conducts a full top-to-toe examination
- Conducts basic investigation
- Plans for the next visit or refer if needed
- Completes all records including antenatal cards and antenatal registry

History taking

Table 10.1 Overview of history taking

Information to include	
Personal information	Check and document: ■ Contact details ■ How many previous pregnancies (G)? ■ How many previous births (>24 weeks) (P)? ■ How many miscarriages (<24 weeks) (+) e.g. G_3P_{2+1}
Complications during pregnancy	Review any risk factors or complications the mother experienced during her pregnancy: ■ Sepsis/infection (premature rupture of membranes, abnormal vaginal discharge): check all clinical observations, ■ Haemorrhage: check observations and Hb level ■ Pre-eclampsia: check observations, especially blood pressure, check urine for proteinuria

Birth	■ Record the date of birth ■ Record where the birth took place ■ Record if live birth or stillbirth ■ Record the mode of birth ■ Record estimated blood loss ■ Record any complications, e.g. perineal tear, episiotomy
Past medical history	■ It is important to review any underlying medical conditions and ensure the woman has follow-up medical care/review if required.

Physical examination

Evaluation of the mother

It is better for the mother and her newborn to be together (in a room which is warm but well ventilated in hot climates) where the healthcare provider can observe them and easily detect if there is a problem with either the mother or the newborn.

Table 10.2 Overview of physical examination

Pain management after spontaneous vaginal delivery	■ Ask the woman if she has any pain ■ Women who have a spontaneous vaginal delivery/instrumental birth are encouraged to take regular analgesia if required for pain: □ For mild pain, paracetamol □ For moderate pain, NSAIDS and/or oral opiates
Perineal care	■ Inspect the perineum ■ Assess the type of vaginal tears ■ Assess the type and amount of bleeding
Bladder (urine output)	■ Check if the woman has passed urine within 6 hours of giving birth and ask her if she is passing a good amount, in order to exclude retention with overflow ■ Increase fluid intake if needed ■ Perform abdominal examination – assess for bladder distention and urinary retention on abdominal examination, ask if there is any pain ■ Assess for urinary incontinence (screen for urge, stress and continuous incontinence) ■ In women with continuous leakage of urine and history of prolonged obstructed labour, assess for obstetric fistula (Chapter 12)
Bowels	■ Assess for ability to pass flatus and faecal continence ■ Increase oral fluids and high fibre foods if necessary
Legs	■ Check that both legs are soft and non-tender, assess for deep vein thrombosis (Chapter 6)

Uterus	■ Measure uterus (fundal) height on day one. The uterus will generally be palpable one finger measurement above the umbilicus ■ Palpate: firmness/bogginess, determine the location of the fundus in relation to the umbilicus ■ Sub-involution may be a sign of retained products of conception and/or sepsis ■ Deviation of the uterus to one or other side may be an indication of a broad ligament haematoma ■ Check for signs of puerperal infection (fever, foul discharges)

Advise women on general hygiene and care

- Check for signs of infection (fever, foul discharge)
- Change sanitary pads regularly
- Regular bathing

Investigations

Review co-morbidities and check if the mother has been screened for HIV, TB, malaria, syphilis, anaemia or diabetes in pregnancy. If the woman has had investigations, ensure that they are followed up and she knows the results and implications of each test.

Often women who have suffered from antepartum haemorrhage or postpartum haemorrhage will be severely anaemic. Check Hb at four days and ten to fourteen days after being discharged from hospital. Ferrous sulphate and folic acid tablets (treatment dose) should be given if Hb <7g/dl. Consider blood transfusion IV or IM iron treatment. Ensure these women have a postnatal Hb check and manage as per Table 10.3.

Table 10.3 Management of anaemia

HB levels	Classified	Action
<7g/dl	Severe anaemia	Will require a blood transfusion
7-11g/dl	Moderate anaemia	Double dose of iron tables for 3 months Advise on iron rich foods
>11g/dl	Normal	Preventative iron/folate tablets for 3 months can be given as well as dietary advice

[!] Symptoms and signs of anaemia are very non-specific and it is easily missed unless Hb is measured.

Psychosocial health

Psychosocial support is recommended for the prevention of postpartum depression among women at high risk of developing this condition. Those at increased risk include women who have suffered stillbirth or neonatal death, or have experienced a traumatic birth with complications, for example, those who have had hysterectomy, or rupture of the uterus (Chapter 14).

Care of the perineum

Over 85% of women having a vaginal birth will sustain some form of perineal injury of which 60-70% of women need repair with sutures and an estimated 5.9% women will experience a third or fourth degree tear.

Table 10.4 Types of perineal tear and management

Degree	Trauma	Management
First degree tear	Injury to the skin only	■ Heals naturally and usually only requires suturing if bleeding significantly.
Second degree tear	Injury to the perineum involving perineal muscles but not involving the anal sphincter	■ The tear requires suturing. ■ It can take up to a month for a tear or cut to heal and for the sutures to dissolve, if they are not reabsorbable.
Third degree tear	Injury to the perineum involving the anal sphincter complex **3a**: less than 50% of external anal sphincter thickness torn **3b**: more than 50% of external anal sphincter thickness torn **3c**: internal anal sphincter torn	■ It is crucial that third and fourth degree tears are repaired in theatre. ■ Failure to repair the anal sphincter correctly will result in long term continence problems. ■ Broad spectrum antibiotics and prophylactic laxatives (lactulose or fybogel) for around 10 days' post-birth to prevent wound infection or possible wound dehiscence.
Fourth degree tear	Injury to the perineum involving the anal sphincter complex (Internal and external anal sphincter) and anal epithelium	

It is crucial that third and fourth degree tears are identified and repaired by an expert to give the woman the best chance of avoiding future anal incontinence. Failure to repair the anal sphincter adequately will result in long term incontinence problems.

Details of the perineal trauma sustained, including information on the type of repair and where the wound is sited, should be discussed with the woman, as this will enable her to more effectively manage and monitor her own recovery.

Discuss with the mother as relevant:

- Type of tear they have
- Perineal care and hygiene
- Pain relief that can be taken: paracetamol, baths
- Signs and symbols of infection
- Bleeding: e.g. number of pads used
- Dietary advice to prevent constipation.
- Dehiscence: a complication where the wound fails to undergo primary healing and breaks down
- Regular change of sanitary pads is advised
- Bleeding is likely to continue for up to 6 weeks after birth but should gradually reduce
- To report if there is urinary or faecal incontinence

Pain relief management

At each visit, the healthcare provider should ask women about their experience of perineal pain and offer advice on its management. For most women, paracetamol will be the first line of pain management. However, women who have more severe trauma may require stronger analgesia, with oral NSAIDS or oral opiates. If available, rectal suppositories can be given in the first 24 hours' post-birth. Some mothers may experience other persistent symptoms, including dyspareunia (difficult or painful sexual intercourse). Advise the woman to abstain from sexual intercourse until perineal area has healed. The perineum should be inspected with consent at each postnatal visit to check for signs of infection, dehiscence, haematoma or abscess.

Recognising complications

Dehiscence

A primary cause of wound dehiscence is sub-acute infection, resulting from inadequate aseptic techniques, or failure of good knot-tying technique.

Symptoms include:

- Pain
- Inflammation of the perineal tissues
- Wound opening spontaneously
- Bleeding

Prevention and treatment

Dehiscence can be prevented by a good knot-tying technique when suturing, reducing stress on the wound edges, asepsis and good surgical technique to avoid the formation of haematomas.

Symptoms and signs of perineal wound infection:

- Pain
- Swelling
- Wound dehiscence
- Purulent and offensive vaginal discharge

Once wound dehiscence or infection occurs, it can be treated by:

- Allowing granulation and healing
- Re-suturing the edges after debridement. If the area is not approximated correctly in the first place, or even if a stitch cuts through later, the edges of the wound may not heal correctly
- Provide antibiotics
- Keep the wound clean

Care of the perineal area

Hygiene

Women should be advised of the need to:

- Wash their hands well before and after changing pads and using the toilet
- Change their pads/pieces of cloth regularly throughout the day
- Bathe regularly to keep their perineal area clean

Wound care
Keep the wound and surrounding area clean to prevent infection. After going to the toilet, pour warm water (ideally previously boiled water left to cool, or just clean water) over the vaginal area to rinse it. Pouring warm water over the outer area of the vagina when passing urine may also help ease the discomfort.

Sutures
Sutures should be removed if they are not re-absorbable (e.g. silk). Chromic catgut is a common episiotomy suture that lasts about 2-3 weeks and does not need to be removed. In general, it is advised that re-absorbable sutures are used but these may not always be available.

[!] Assess, document and educate regarding the type and amount of vaginal bleeding.

Vaginal discharge is bloody during the first three days and then blood tinged. It is usually odourless and stops after 15-21 days.

Explain to the mother what normal lochia is and when to seek care:
- Change in colour of lochia
- Increase in amount of lochia
- Offensive smelling lochia
- Abdominal pains
- Feeling generally unwell

Care for the woman following a Caesarean section

Routine care of woman following a Caesarean section

Monitoring
In addition to general postnatal care, women who have had a Caesarean section should be provided with:
- Regular post-operative observations, ideally every 30 minutes for two hours decreasing to hourly for the next two hours provided observations are within normal parameters.
- Breastfeeding: support should be provided to help the baby latch on and initiate breastfeeding.

Pain management after Caesarean section
Women who have had a Caesarean section should be prescribed and encouraged to take regular analgesia for postoperative pain, using:

Analgesia	Dosage
Morphine (IV)	5-15mg (4 hourly)
Morphine (IM)	2.5-10mg (4 hourly)
Pethidine	50mg (6 hourly)
NSAIDs (Diclofenac)	400mg (4 hourly)
Codeine	30mg (6 hourly)
Paracetamol	1g (4-6 hourly)

Wound care

Caesarean section wound care should include:

- Changing the dressing 24 hours after the Caesarean section.
- Specific monitoring for infection (increased pulse rate, respiratory rate, temperature).

Infection prevention:

- Assess the wound for signs of infection (such as increasing pain, redness or discharge), separation or dehiscence.
- Gently clean and dry the wound daily.
- Check for wound haematoma.
- Plan for the removal of sutures or clips at day 5-7.
- Internationally, routine oral antibiotics treatment post Caesarean section is not recommended
- If women are showing signs of infection post Caesarean section, local policies should be adhered to. A suggested treatment regine is:
  - □ Clindamycin 600mg IV 8 hourly

  PLUS
  - □ Gentamicin 5mg/kg body weight IV 24 hourly

Bladder

- Removal of the urinary bladder catheter should be carried out once a woman is mobile.
- It is important to check that good volumes of urine are passed regularly and monitor for any signs of retention.
- Healthcare providers caring for women who have urinary symptoms should consider the possible diagnosis of urinary tract infection or stress incontinence (occurs in about 4% of women after a Caesarean section). An iatrognic urinary fistula may also be a complication of Caesarean section.

Bowels

- Check that a woman who has had a Caesarean section has passed flatus within 12 hours. Failure to pass flatus especially when accompanied by excessive pain and abdominal distension may be a sign of paralytic ileus. Listen for bowel sounds. Most women experiencing ileus will recover within 24 hours of conservative treatment and intravenous hydration.
- Check that the woman who has had a Caesarean section has passed faeces within 24-48 hours. If passing flatus but not faeces, laxatives may help.
- Women who have had an uncomplicated Caesarean section and who do not have complications can drink immediately after the procedure and eat when they feel hungry.

Legs

- Women who have had a Caesarean section are at increased risk of thromboembolic disease (both deep vein thrombosis and pulmonary embolism) (Chapter 6).
- Encourage early and frequent mobilization (sitting in a chair, walking around, getting up from the bed) to prevent thrombosis and pulmonary embolism.
- Healthcare providers need to pay particular attention to women who have chest symptoms (such as cough, chest pain of sudden onset or shortness of breath) or leg symptoms (such as painful swollen calf).
- Warfarin may safely be prescribed after childbirth.

Resuming activities

- Women who have had a Caesarean section should resume activities such as carrying heavy items and sexual intercourse only once they have fully recovered from the Caesarean section. This may take up to 6-8 weeks.

Early skin-to-skin contact between the woman and her baby should be encouraged and facilitated because it improves maternal perceptions of the infant, mothering skills, maternal behaviour, and breastfeeding outcomes. Women who have had a Caesarean section should be offered additional support to help them to start breastfeeding as soon as possible after the birth of their baby. This is because women who have had a Caesarean section are less likely to start breastfeeding in the first few hours after the birth, but, when breastfeeding is established, they are as likely to continue as women who have a vaginal birth.

Pregnancy and childbirth after a Caesarean section

If information is available from the delivery notes, discuss the indication for the Caesarean section. The healthcare provider should the make a plan for subsequent pregnancies with the woman and discuss vaginal birth after Caesarean section. All women with a previous Caesarean section should be advised to deliver in a healthcare facilities for subsequent pregnancies.

- Planned vaginal birth after Caesarean section is appropriate for and may be offered to the majority of women with a singleton pregnancy of cephalic presentation at 37+0 weeks or beyond and those who have had a single previous lower segment caesarean delivery, with or without a history of previous vaginal birth.
- Planned vaginal birth after Caesarean section is contraindicated in women with previous uterine rupture or classical Caesarean scar and in women who have other absolute contraindications to vaginal birth that apply irrespective of the presence or absence of a scar (e.g. major placenta praevia). However, all women with a previous Caesarean section should deliver in a healthcare facility for subsequent pregnancies.

Care of the newborn baby

Assessment – History, physical or clinical examination and laboratory tests

Look for danger signs and take action: the healthy newborn must be given routine newborn care. A sick newborn must immediately be given appropriate treatment by the appropriate healthcare provider.

- Ensure that: all healthcare providers and the mother wash their hands before touching the newborn.
- Keeping the newborn warm: dry the baby immediately after birth, place on the mother's abdomen (skin-to-skin), cover with a clean towel/blanket and a hat on the head. Do not bathe the newborn for the first 24 hours.
- Keeping the newborn clean: clean the umbilical cord and wipe the newborn baby's eyes with a clean cloth.

Preventive treatment

Routine prophylaxis for gonococcal ocular infection
For all newborns, apply 1% tetracycline eye ointment: a 1cm strip in each eye, within one hour after birth.

Routine prophylaxis for haemorrhagic disease of the newborn
Newborn babies are relatively deficient in vitamin K and those who do not receive supplements of vitamin K are at risk of bleeding including intracranial bleeding. It is recommended that all newborn babies should receive vitamin K to prevent vitamin K deficiency bleeding (previously termed haemorrhagic disease of the newborn). Vitamin K may be given by a single intramuscular injection at birth; this prevents vitamin K deficiency bleeding in virtually all babies.

All newborn babies should be offered vitamin K. If consent is obtained from the mother it can be given IM.
- If birth weight below 1.5kg, give 0.5mg of vitamin K IM
- If birth weight above 1.5kg, give 1mg of vitamin K IM

Immunisation of the newborn
Consent for administration of all immunisations must be obtained from the parents and recorded in the immunisation card and child health record.

The following immunisations are given within 24 hours of birth:
- Oral polio
- Hepatitis B
- If an unimmunised newborn is first seen 1-4 weeks of age, give the Bacillus Calmette-Guérin vaccine only.

Advise the mother when to return for next immunisation.

Table 10.5 Schedule for immunisations

Routine immunisation schedule			
Age due	**Diseases protected against**	**Vaccine given**	**Dosages**
Birth <1 week	Tuberculosis	Bacillus Calmette-Guérin (BCG)	Given at birth in most resource-poor settings
	Polio	OPV	4 doses given orally at birth 6, 10 and 14 weeks
	Hepatitis B	HepB 1	Administered in areas with a high incidence of Hepatitis B
6 weeks old	Polio	OPV	4 doses given orally at birth, 6, 10 and 14 weeks
	DTaP	Diphtheria, tetanus, pertussis	3 doses at intervals of 4 weeks; first dose at 6 weeks then at 10 weeks and 14 weeks
	Hepatitis B	HepB 2	Administered in areas with a high incidence of Hepatitis B

Assessment and examination of the newborn baby

Assessment of the newborn

- Babies should be placed in skin-to-skin contact with their mothers immediately following birth.
- Initiate breastfeeding within one hour when the suckling reflex is at its strongest.
- Delayed cord clamping should be standard practice unless the infant needs immediate resuscitation.

Conducting an examination

- Prepare the room and equipment needed for the assessment.
- Room temperate should be approximately 25° C, if not, use a heater.
- Greet and congratulate the mother or relative.
- Gather information about the birth from the mother or relative.
- Do not forget to wash hands before and after touching the newborn.
- Within an hour of birth conduct a full examination of the baby and explain the results to the mother and document the findings.

Table 10.6 Assessment of the newborn

Check	Look	Feel
■ Weight ■ Temperature ■ Breastfeeding □ Position □ Attachment ■ Respiratory rate ■ Heart rate	■ Screen from top-to-toe, midline and back examination ■ Colour □ Jaundice □ Cyanosis □ Anaemia ■ Skin □ Pustules □ Rash □ Bruises ■ Eyes ■ Ears ■ Mouth ■ Chest indrawing ■ Umbilicus ■ Orifices examination	■ Abnormal swelling ■ Femoral pulses ■ Capillary refill time ■ Palpate the abdomen ■ Feel for testes (male baby)

Table 10.7 Observations in the healthy newborn

Observations	Minimum	Normal range
Heart rate	4-6 hourly	■ 100-160 beats/min
Respiratory rate	4-6 hourly	■ 30-60 breaths/min
Chest in drawing Nasal flaring	4-6 hourly	■ None/mild in small babies
Colour	At birth, examination and once a day	■ Pink and capillary refill less than 2 seconds
Skin	At birth, examination and once a day	■ Absence of rash or jaundice

Umbilical cord	Once a day	■ Absence of redness around the umbilical cord, absence of purulent discharge from the cord
Auxiliary body temperature	4-6 hourly	■ 36.5 to 37.5°C
Posture and movement	At birth, once a day and at discharge	■ Arms and legs are flexed and newborn is active ■ Reacts to touch, light and sounds
Feeding and breastfeeding positioning	During feeds in the first 48 hours	■ Baby is able to suck
Urine and stools	6 hourly	■ Passes urine and stools within 24 hours after birth ■ From birth to 2 days: meconium (stool) is thick, sticky and dark green/black
Genitalia		■ Female infants may sometimes experience a little vaginal bleeding but this is normal
Weight		■ Low birth weight baby <2.5kg ■ Normal birth weight 2.5kg-4.5kg ■ Macrosomic newborn >4.5kg
Head circumference and body length		■ Head circumference 31.5-37cm ■ Length 45-55cm

Breastfeeding

- During the first 6 months of life, the baby needs nothing more than breast milk – NOT water, other milk, cereals, tea or juice.
- Breast milk contains exactly the correct amount of water and nutrients that a baby's body needs. It is easily digested and efficiently used by the baby's body. It helps protect against infections and allergies and helps the baby's growth and development.
- When the baby suckles, the uterus contracts. This helps reduce bleeding, but may be painful at first.
- If a woman is breastfeeding every six hours, this will prevent ovulation and will delay a new pregnancy.

Suggestions for successful breastfeeding

- The newborn baby should be with the mother at all times.
- Breastfeeding should start within 1 hour of birth.
- The newborn's suckling stimulates milk production. The more the baby feeds, the more milk the mother will produce. Mothers should be encouraged to feed the newborn 4-6 hourly.
- At each feeding, let the baby feed and release your breast, and then offer your second breast. At the next feeding, alternate and begin with the second breast.
- Inform the mother of the benefits of the first milk (colostrum). It is nutritious and has antibodies to help keep the newborn healthy.
- While breastfeeding, the mother should be encouraged to drink plenty of clean, safe water. The mother should eat increased amounts, healthier foods and rest when possible.

The healthcare provider can show the woman how to correctly position the baby and ensure the baby attaches to the breast. This will reduce breast problems for the mother.

Hand expressing

The healthcare provider can also show the mother how to express milk from her breast with her hands before she is discharged and inform the woman about breastfeeding support groups, if available.

- To stimulate milk supply if the newborn is sleepy, or not able to suckle well at the breast.
- For prematurity, or a newborn in a neonatal unit separated from its mother for another reason.
- Mothers in this situation should be encouraged to express eight times, including at least once during the night, in a 24-hour period.
- Hand expressing can relieve fullness if uncomfortable or for engorgement, blocked ducts or mastitis.
- It can be used prior to using a breast pump.
- If the mother is returning to work or is away from her baby, it will ensure and consistent supply of breast milk.

Perinatal death

Definitions

Perinatal describes the period surrounding birth, and includes the time from fetal viability (24-28 weeks of pregnancy depending on the context and setting) up to either 7 or 28 days of life.

- **Perinatal mortality:** fetal deaths after 24-28 completed weeks of gestation and death before seven completed days.
- **Stillbirth:** a baby that is issued forth from its mother after the 24-28th week of pregnancy and which did not, at any time after being completely expelled from its mother, breathe or show any other signs of life.
- **Neonatal mortality:** death before the age of 28 completed days following live birth.
- **Early neonatal death:** death in the first seven days.
- **Late neonatal death:** from seven and up to 28 days.

Management

Bereavement care:

- Stillbirth is a devastating event for the mother, father and the wider family.
- The mother and father should be given time and space for reflection in a suitable environment.

It is important that the healthcare provider takes the time to explain what has happened clearly and without any judgment or attitude of blame.

- Discuss with a woman whose baby is stillborn or dies soon after birth if:
  - □ She would like to see the baby
  - □ She would like to hold the baby

In general, it will be helpful to the mother to at least have seen the baby.

- They will need to collect their belongings and may want to make funeral arrangements.
- Hospital counsellors and the priest and/or other religious leaders may provide comfort to families of stillborn infants or in a case of neonatal death.
- In most countries, to register the stillbirth/neonatal death, the medical certificate issued by the doctor or midwife present at the time is required.

It is important that healthcare providers are aware of cultural practices surrounding stillbirth or the death of a newborn baby. It is important that the healthcare providers dispel myths and misconceptions and provides the mother with as much information as possible regarding the cause of the stillbirth or neonatal death.

Women who have had a complication in pregnancy and childbirth

Up to 15% of women will experience complications during pregnancy or at the time of birth. In the postpartum period, this will require follow-up and sometimes treatment. The postpartum period is also a good time to review what happened during the birth, explain any complications the woman may have had, the management she received and any implications for future pregnancy and childbirth. It is essential that any follow-up treatment and care is planned with the woman postnatally and she is aware of need to attend for postnatal care.

Discharge information

General advice to give the woman when discharging her from the facility after 24 hours:

- Women should be offered information and reassurance on the physiological process of recovery after birth (within the first 24 hours) and the normal emotional changes in the postnatal period, that usually resolve within 10 to 14 days of giving birth
- Contact a healthcare provider if any danger signs
- Have enough rest and sleep
- Exclusive breastfeeding
- Contraception: If she has not already received a postpartum method in the healthcare facility, every woman should receive advice on appropriate family planning options for a breastfeeding mother
- Immunisation and growth monitoring of the newborn
- Return postnatal visits: day 3, between days 7 to 14 after birth and at 6 weeks
- Documentation completing the postnatal card

[!] Ensure that before discharge, you have documented everything correctly on both the mother's card, baby's card, and in the case notes.

Danger signs in the mother and newborn baby

The healthcare providers should inform the mother of danger signs for herself and the newborn and advise her to attend a healthcare facility as soon as possible. The healthcare provider needs to recognise and act on symptoms and signs of potentially life-threatening conditions. It is the responsibility of the healthcare provider to stabilise and refer women or newborn to the appropriate level healthcare facility immediately using an observation chart.

Table 10.8 Maternal danger signs and symptoms of potentially life-threatening conditions

Symptoms and signs	Diagnosis
Sudden and profuse blood loss or persistent increased blood loss; faintness; dizziness; palpitations/tachycardia	Postpartum haemorrhage
One or more of the following symptoms: Headaches Visual disturbances Nausea Vomiting	Pre-eclampsia/eclampsia
Unilateral calf pain; redness or swelling of calves; shortness of breath or chest pain	Deep vein thromboembolism or Pulmonary thromboembolism
Fever, shivering, abdominal pain and/or offensive vaginal loss	Sepsis

Management of danger signs and complications in the mother are discussed in Chapter 12.

Table 10.9 Newborn danger signs

Symptoms and signs	Possible Diagnosis
■ Stopped or not breastfeeding well	Infection
■ Convulsed or fitted since birth	Infection
■ Fast breathing at a rate of 60 breaths per minutes or more	Infection
■ Severe chest in-drawing or grunting	Infection/hypoxic-ischemic encephalopathy
■ High temperature 37.5°C or more	Infection
■ Low temperature 36°C or less	Infection
■ Vomits after every feed	Pyloric stenosis
■ Lethargic or unconscious – Less active than before	Infection
■ Movement only when stimulated, or no movement even on stimulation	Respiratory distress/infection
■ Floppy or stiff	Respiratory distress/infection
■ Central cyanosis	Respiratory distress/infection
■ >10 skin pustules	Infection
■ Any jaundice in first 24 hours of life, or yellow palms and soles at any age	Jaundice, pathological if presents within 24 hours
■ Umbilicus draining pus or umbilical redness extending to skin	Umbilical infection
■ Bleeding from umbilical stump	Cord clamp has been dislodged/infection

Management of danger signs in the newborn are discussed in Chapter 13.

Chapter 11: Postnatal care for mother and baby: subsequent visits

In this chapter, you will find information about:
- Systematic assessment for mother and baby
- Screening and support for mental ill-health
- Screening and support for domestic violence and substance misuse

Care of the mother and her newborn after birth is known as postnatal care. Postnatal care provides a unique opportunity to provide a full comprehensive and holistic assessment of the mother and newborn. It ensures the mother is healthy, capable of taking care of her newborn and is equipped with the information she needs to do so. This chapter will discuss care that is given in the late postnatal period. It is essential that the woman is informed of when she should attend for each postnatal visit and inform her to attend all scheduled postnatal visits along with her newborn. She should also be informed that if the healthcare worker has any concerns.

Schedule
- Day three (within 48 to 72 hours of giving birth)
- Between days 7 to 14 after giving birth
- At six weeks after giving birth

Assessment

History
- Discuss with the mother how she is feeling and ask whether she has noticed any danger signs in herself and/or for her baby (Chapter 10, Tables 10.8 and 10.9).
- Assess the mother and baby and refer for appropriate treatment if required.

Physical examination

Clinical observations
Check mothers' vital signs – temperature, pulse rate, respiratory rate and blood. If clinical observations are outside normal limits assess for cause and treat.
- If diastolic blood pressure >90mmHg, and other symptoms are present that are indicative of hypertension refer for inpatient assessment.
- If the temperature ≥38°C or <36°C, identify the case of fever.
  - □ If she is coughing, is it a productive cough? If yes, admit for further diagnostics and management.
  - □ Does the lochia have an offensive smell and/or there is more than usual? If yes, treat with oral antibiotics.
  - □ Check the rapid test for malaria. If positive, admit.
- If not clear cause for fever is identified, admit.

Examination of the uterus

- By days 5 to 6, the fundus of the uterus is palpable halfway between the navel and the symphysis pubis.
- By day 10, the symphysis pubis should be palpable just above the symphysis pubis.
- After six weeks, the uterus returns to its normal size i.e. is not palpable abdominally.

[!] Sub-involution may be a sign of retained products of conception and/or sepsis.

Examination of the perineum

- Ensure that the episiotomy or any tears/level of lacerations are healing.
- Signs of infection include redness, persistent swelling, presence of pus. Note that delayed healing may be a sign of infection.
- Advise on perineal hygiene and safe disposal of sanitary wear.

Discuss personal hygiene in the context of local practices and the environment. Discuss with women the type of pads they will use and their disposal, and care of perineum/episiotomy in the context of home conditions.

Handwashing is particularly important to prevent infections. It is also important not to insert anything into the vagina.

Postpartum bleeding and lochia

Discuss with women how much blood loss they can expect and for how long. The lochia should progressively decrease and if it does not this may indicate a problem. When bleeding is more than normal, they must seek care urgently. Normal lochia does not have an offensive odour and lochia can persist for up to 6 weeks.

Examination of the legs

- Check that both legs are soft and non-tender and not different in circumference.
- Assess for calf pain which may be a sign of a deep vein thrombosis.

Bladder and Bowel function

- Assess for urinary incontinence (ask about urge, stress or continuous incontinence).
- If the mother complains about continuous incontinence conduct a speculum examination or refer her to a healthcare facility for assessment of an obstetric fistula (Chapter 12).

Screening for psychological ill-health

The birth of a new baby can lead to many emotional changes. Many women go through a period of mild depression following the birth of a baby. There is a need to differentiate between postnatal ‘blues’ (feeling down) which usually occur in the first week and can last up to two weeks after birth, and postnatal depression which is much more severe and usually lasts for a longer period.

Assess for symptoms and signs of postpartum depression (Chapter 14). It is important to differentiate between the early onset severe type of postnatal depression with psychotic features (visual or auditory hallucinations).

Management

If you identify a new mother with depression, then you should refer her as soon as possible to the nearest healthcare facility for management and treatment if required.

- Arrange to meet on a regular basis to show empathy, to listen and support.
- Ask her consent to discuss her situation with a family member or friend who she feels may be able to provide her with support.
- Encourage her family to involve her in social activities and activities that used to make her happy in the past.

Screening and support for domestic violence

- The healthcare provider must be alert for signs of any safeguarding issues and be aware of policies to communicate and refer concerns.
- Screen for domestic violence using a screening tool (Chapter 14 and Appendix 6).

Supporting breastfeeding

Breast examination

The breasts are usually soft on palpation during the first 24 hours post-delivery.

Colostrum (first milk)

Breasts produce colostrum during the first few days after birth. It is usually a golden yellow colour with a high concentration of nutrients and helps the baby to fight infections. The amount of breast milk produced will vary from a few drops to a teaspoon, this is all the baby needs. In some cultures, feeding babies with colostrum is frowned upon and may require further explanation.

The newborn may want to feed quite often, perhaps every hour to begin with. Then have fewer, longer feeds once the breast start to produce more milk after a few days. It is important to inform the mother that the more she breastfeeds, the more the newborn's sucking will stimulate her supply and the more milk she will produce.

Examination of the breasts

- Check breasts for discolouration, bruising, open wounds, presence of mastitis
- Ask if there is pain when feeding
- From day 2-4, milk secretion is established in most cases and the breast should not be engorged if feeding is going well

Check

- Inspect: size, symmetry, shape of breast and nipples
- Palpate: fullness, soft or engorged, firmness and lumps
- Redness, bruising, open wounds, presence of mastitis (Chapter 7) and colostrum

It is important that the mother knows the correct technique for proper positioning of the newborn and attachment to avoid cracking of the nipples.

Flat or inverted nipples

1. Suggest that the mother expresses a small amount of milk by hand or pump immediately before the feed.
2. Encourage the mother to keep her breasts as supple as possible by expressing them regularly until the baby has established feeding.
3. Use a nipple shield to assist the baby to latch onto the breast. The thin silicone shield fits over the nipple so making it easier for the baby to latch onto it. The nipple shape will gradually improve, as it will be pulled into the shield as the baby suckles.

Cracked nipples

Symptoms: nipple erosion and pain when breastfeeding. Often caused by incorrect latching onto the breast.

- Check the positioning of the newborn when feeding.
- Clean the breast with clean water and soap before and after each feed.

Breast engorgement

Breast engorgement is common in the first few weeks as the milk supply regulates and can also cause breast pain. It usually lasts for 2-3 days.

- Regular analgesia will be required until the engorgement settles.
- Apply a warm compress (towel) before breastfeeding.
- Hand express a little breast milk before feeding the baby. This will help to relieve some of the pressure and discomfort and soften the breasts to make it easier for the baby to latch on.
- Breastfeed more frequently to empty the full breasts.

Mastitis

- This becomes evident when the woman has a painful area of redness on her breast, has a fever and feels generally unwell.
- Continue breastfeeding (or expressing milk).
- Ensure that the woman is using a proper breastfeeding bra, and that there is no pressure on the breast during feeding.
- Antibiotics may be required, so arrange for the woman to visit a healthcare provider.
- Analgesics may be required until the infection clears.
- Encourage the woman and tell her that this condition usually resolves within 2-3 days.

Inadequate supply of breast milk

- Encourage the woman to eat a nutritious diet and maintain her fluid intake.
- Encourage the woman to take rest while the baby is asleep.
- Put the baby to the breast frequently, and/or express 3 hourly, or more frequently
- Encourage to the woman.

Assess correct breastfeeding attachment

Newborn

- Mouth wide open
- Chin touching the breast, lower lip down, nose not blocked
- Very little areola visible underneath the chin

Mother

- Should feel no pain when feeding

Table 11.1 Indicators of successful breastfeeding

Mother	Newborn
■ Breast softens after feeding ■ No mis-shapen nipple at the end of the feed ■ Mother relaxed during feeding	■ Swallowing visible ■ Audible rhythmic suck ■ Body is relaxed ■ Frequent passing of urine and stools

Contraception

There is an opportunity for healthcare providers to discuss contraception options for women when they attend for antenatal care, delivery, postpartum care or the immunisation of their baby. There are several options available for women after childbirth. These are outlined in Table 11.2 below. Healthcare providers can discuss all relevant options with the woman so that she can make an informed choice.

The timing and choice of family planning method depends on:

- Breastfeeding status
- Reproductive health goal and fertility desires

Table 11.2 Family planning methods

Options for breastfeeding women		
Methods that can be used immediately postpartum: □ Female sterilisation – within 7 days or delay 6 weeks □ Intrauterine contraceptive device – in the 48-hour period after birth or delay until 4 weeks □ Abstinence	Methods that must be delayed 6-week delay □ Progestogen-only oral contraceptives □ Progestogen-only injectable, implants	6-month delay: □ Combined oral contraceptive pill □ Combined injectable
Options for non-breastfeeding women		
Methods that can be used immediately postpartum: □ Progestogen-only oral contraceptive □ Progestogen-only injectable or implant □ Female sterilisation – within 7 days or delay 6 weeks □ Intrauterine contraceptive device – in the 48-hour period after birth or delay until 4 weeks □ Abstinence	Methods that must be delayed 6-week delay: □ Combined oral contraceptive pill □ Combined injectable	

The postpartum intrauterine device

A copper intrauterine device can be inserted within 48 hours of delivery and is a safe and highly convenient choice for women who desire long-acting, reversible, non-hormonal protection from pregnancy starting during the critical postpartum period.

After the assessment of the woman has been completed and the woman has made an informed choice, the healthcare provider may insert the intrauterine device and provide post insertion instructions to the woman.

Types of postpartum intrauterine device insertion are:

- **Post placental insertion**

When the intrauterine device is inserted within 10 minutes after the expulsion of the placenta following a vaginal delivery.

- **Immediate postpartum insertion**

When the intrauterine device is inserted after the post placental period but within 48-72 hours of a vaginal delivery.

- **Trans-Caesarean insertion**

When the insertion takes, place following a Caesarean delivery, before the uterine incision is closed.

- **Interval insertion**

Insertion of the intrauterine device at ≥4 weeks postpartum.

Assessment of the baby

Cord care

- The umbilical stump will naturally harden and dry once it is exposed to the natural air and so should not be covered.
- It takes on average 10 days for the cord to separate and drop off. During this time, it is normal to see some sticky discharge from the cord as it begins to separate which can be removed using clean water and cotton wool. Do not apply any creams or powder or natural herbs to the cord.

Chlorhexidine

- Daily chlorhexidine (7.1% chlorhexidine digluconate aqueous solution or gel, delivering 4% chlorhexidine) application to the umbilical cord stump during the first week of life is recommended for newborns who are in in settings with high neonatal mortality (30 or more neonatal deaths per 1000 live births).
- Clean, dry cord care is recommended for newborns born in healthcare facilities and at home in low neonatal mortality settings. Use of chlorhexidine in these situations should be considered in order to replace application of a harmful traditional substance, such as cow dung, to the cord stump.

Assessment of weight

Check the scales and calibrate them daily according to instructions.

- Weigh the newborn monthly.
- Weigh the newborn if feeling unwell or not feeding.

Some newborns tend to gain weight more slowly than others. Most newborn babies lose weight at first and then go back to their birth weight at around two weeks old. The rate of weight gain varies depending on the baby's age:

- 2 weeks to 4 months – 125-200g (5-8oz) per week
- 4 to 6 months – 50-150g (2-6oz) per week
- 6 to 12 months – 25-75g (1-3oz) per week

Table 11.3 Acceptable weight loss and expect weight gain in the first month of life

Age	Weight
1 week	Loss up to 10%
2-4 weeks	Gain at least 160g per week (15g/day)
1 month	Gain at least 300g first month

HIV, TB and syphilis after childbirth

Newborns that are born to mothers that are HIV or syphilis positive, or mothers that have been diagnosed with TB and started treatment less than 2 months before delivery should receive the treatment outlined below. It is essential that the healthcare provider teaches the mother to administer treatment at home and ensure she is given the medication or a prescription for the medication required until the next visit.

- Explain and how the drug is given.
- Wash hands.
- Demonstrate how to use the syringe and how to measure the dose.
- Watch the mother as she administers the medication.
- If the newborn vomits or spills the medication within 30 minutes the mother should repeat the dose.

Table 11.4 Risk identification in newborns

Mother:	RISK
■ Venereal disease research laboratory tested positive ■ Treated HIV positive ■ Receiving TB treatment	■ Congenital syphilis ■ HIV transmission ■ TB

Table 11.5 Management

Baby classified as:	Management
1. Risk of congenital syphilis	■ Give the baby a single dose of Benzathine Penicillin 50,000 IU/kg immediately, whether the mother was treated during pregnancy or not. ■ Ensure mother and partner are also treated. ■ Follow up in 2 weeks.

2. Risk of HIV transmission	If the mother is: ■ On highly active antiretroviral therapy, whether breastfeeding or not, give the baby Nevirapine 2mg/kg/birth weight once daily for 6 weeks. ■ If breastfeeding, give the baby Nevirapin 2mg/kg/birth weight once daily until one week after the cessation of breastfeeding. ■ If not breastfeeding, give the baby the Nevirapine 2mg/kg/birth weight once daily for 6 weeks. ■ Ensure mother, partner and other siblings are tested. ■ Follow up in 2 weeks.
3. Risk of tuberculosis	■ Give the baby isoniazid 5mg/kg/birth weight prophylaxis for 6 months. ■ Give Bacillus Calmette-Guérin vaccination to the baby only when the baby's prophylaxis is completed. ■ Follow up in 2 weeks. ■ X-ray the baby's chest at 6 weeks and review if the baby has active TB.

Treatment of TB in women who breastfeed

Anti-TB drugs are excreted into breast milk, though the dose that is found in breast milk is less than the therapeutic dose for infants. Breastfed infants may receive as much as 20% of the therapeutic dose of isoniazid for infants, while other anti-TB drugs are less excreted.

No toxicity has been reported from this small concentration in breast milk. Caution must, however, be exercised as the breast milk dose may contribute to the development of abnormally high plasma levels in newborns who are on anti-TB medication.

See Chapter 8 for more information regarding care of the mother and newborn with TB.

Feeding problems

Breastfeeding may not always be easy or successful straight away. It is very important that the mother is well supported to continue breastfeeding. It may take a few days for breast milk to come into the breasts in sufficient quantity. The mother may need to drink more and may simply be tired or unwell. Breastfeeding is often difficult at first when preterm birth has occurred or in the case of a multiple pregnancy.

Newborns who cannot breastfeed and/or use alternative feeding methods

- Give expressed breast milk via a cup or syringe, if the newborn can swallow.
- If the newborn is too weak to suck and swallow, or the baby has been choking or regurgitating after the feed, insert a nasogastric tube.

Reflexes involved in oral (breast) feeding

- **Rooting reflex:** seen in normal newborn babies, who automatically turn the face toward the stimulus and make sucking (rooting) motions with the mouth when the cheek or lip is touched. This reflex helps to ensure successful breastfeeding.
- **Sucking reflex**: when the roof of the baby's mouth is touched, the baby will begin to suck. This reflex does not begin until about the 32nd week of pregnancy and is not fully developed until about 36 weeks.
- **Swallowing reflex**: consists of both receptive and motor nervous system pathways.

These reflexes are normally fully developed by 36 weeks' gestation.

How to assess the rooting reflex

- The healthcare provider uses a clean finger to touch the cheeks or upper lip of the baby and assesses the baby make sucking motions or turns the face towards the finger.

How to assess the sucking reflex

- Preterm babies may have weak or immature sucking ability.
- The healthcare provider can insert a clean finger in the baby's mouth to check the sucking reflex, an assessment can be made on the rate and strength of the suck.

How to assess the swallowing reflex

When the swallowing reflex is absent or the coordination between sucking, swallowing and breathing is impaired the baby is at risk of choking as the milk can block their airway.

The following are some causes of feeding problems in the mother and baby:

Mother:

- Sore/damaged nipples
- Nipples which are misshapen
- Mastitis
- Not enough milk produced
- Exhaustion from frequent/constant feeding
- Distress from failing to establish breastfeeding

Baby:

- Premature birth
- Low birth weight
- Respiratory problems
- Tongue-tie

Tongue-tie

Also known as ankyloglossia, tongue-tie is caused by a short or tight membrane under the tongue (the lingual frenulum). Tongue-tie is congenital (present at birth) and hereditary (often more than one family member has the condition). It occurs relatively often: between 0.2% and 2% of babies are born with tight frenulums.

Management
Many babies who have tongue-tie have no symptoms or problems at all.

Treatment is needed if a tongue tie is preventing effective breastfeeding to the extent that the infant is losing significant amounts of weight or the mother's nipples are damaged. A trained healthcare provider can cut the tongue-tie. It is a relatively painless procedure and because the frenulum contains almost no blood, there is usually only a drop or two of blood. The baby is put on the breast immediately following the procedure, and the bleeding stops almost instantly. Anaesthesia and stitches are not necessary.

Localised infections

Once the newborn has been assessed and a localised infection has been identified that does not need treatment with antibiotics or referral to a healthcare facility, the healthcare provider should advise the mother how to treat at home. The healthcare provider should explain and show how the treatment is given and watch the mother as she carries out the first treatment. Ask the mother to let you know if the local infection gets worse and to return to the clinic if possible.

Management
Skin pustules or umbilical infections. Do the following 3 times daily for 5 days:
- Wash hands with clean water and soap.
- Gently wash off pus and crusts with boiled and cooled water and soap.
- Dry the area with clean cloth.
- Paint with gentian violet.
- Wash hands.

Treatment for eye infection. Do the following 6-8 times daily for 5 days:
- Wash hands with clean water and soap.
- Wet clean cloth with boiled and cooled water.
- Use the wet cloth to gently wash off pus from the baby's eyes.
- Apply 1% tetracycline eye ointment in each eye 3 times daily.
- Wash hands.

Once treatment has been initiated the newborn should be assessed in 2 days
- Assess the skin, umbilicus or eyes.
- If pus or redness remains or is worse, refer to hospital.
- If pus and redness have improved, tell the mother to continue treating local infection at home.

Screening for other conditions in postnatal period

Advice on Nutrition

- Women in the postnatal period need to maintain a balanced diet, just as during pregnancy.
- Advise the woman to eat a greater amount and variety of healthy foods, such as meat, fish, oils, nuts, seeds, cereals, beans, vegetables, to help her feel strong and well (depending on local availability and affordability).
- Discuss any local taboos that exist about foods.
- Iron and folic acid supplementation should also continue for 3 months after birth.
- Women who are breastfeeding require additional food and should drink sufficient clean/safe water.

Malaria prevention

In endemic areas pregnant women should be encouraged to sleep under a long-lasting insecticide-treated net from as early in pregnancy as possible and to continue using the net during the postpartum period, together with their babies. They should also be encouraged to seek care if the newborn becomes unwell. Assess any postpartum woman with anaemia and/or fever who has been exposed to malaria and treat if diagnosed.

Cervical cancer

- Cervical cancer is a leading cause of cancer-related deaths in women.
- Women 30-49 years old are most at risk for cervical cancer.
- Any woman who has had sexual relations and hence has been exposed to human papilloma virus is at risk of developing cervical cancer

Symptoms and signs of cervical cancer

- Signs of cervical cancer include: foul-smelling vaginal discharge, vaginal bleeding, bleeding after sexual intercourse, or any bleeding after menopause. Women with these symptoms should seek medical care promptly.
- There are no symptoms or signs for the early changes of pre-cancer. Screening is the only way to detect pre-cancer.

In low- and middle-income countries, cytology-based programmes are very difficult to implement, and where they are implemented, the screening coverage is low.

- All women aged 30-49 years should be screened for cervical cancer at least once.
- There is a vaccine for woman 13-26 years of age that can help prevent cervical cancer, prior to first sexual contact.

Breast cancer

Breast cancer is a common cancer in women in low- and middle-income countries.

Symptoms

The first symptom of breast cancer most women notice is a lump or an area of thickened tissue in their breast.

Advise women to check for:

- A new lump or area of thickened tissue in either breast that was not there before
- A change in the size or shape of one or both breasts
- Bloodstained discharge from the nipples
- A lump or swelling in either armpit
- Dimpling on the skin of the breasts
- A rash on or around the nipple
- A change in the appearance of the nipple, such as becoming sunken into the breast

Prevention

Control of specific modifiable breast cancer risk factors as well as the effective integrated prevention of non-communicable diseases which promotes healthy diet, physical activity and control of alcohol intake, weight and obesity, could eventually have an impact in reducing the incidence of breast cancer in the long term.

Chapter 12: Obstetric complications in the mother after birth

In this chapter, you will find information about:
- Obstetric complications that may occur in the postnatal period (postpartum haemorrhage, eclampsia and sepsis)
- Urinary and faecal incontinence

Postpartum haemorrhage

Definition

Postpartum haemorrhage is vaginal bleeding in excess of 500mls after childbirth. In women with anaemia in pregnancy, even a small amount of blood loss is dangerous. All women should be considered at risk of postpartum haemorrhage and haemorrhage prevention must be a part of every birth.

Types of postpartum haemorrhage
- Primary postpartum haemorrhage is blood loss of more than 500ml (a pint) of blood within the first 24 hours after birth.
- Secondary postpartum haemorrhage occurs when you have abnormal or heavy vaginal bleeding between 24 hours and 12 weeks after the birth.

Table 12.1 Clinical signs and symptoms of postpartum haemorrhage

Circulating volume lost	Signs
Up to 500ml (1 bottle)	No symptoms or signs
1.5L (3 bottles)	Increase in pulse and respiratory rate, cold, pale
2L (4 bottles)	Increase in pulse and respiratory rate, only now fall in blood pressure, cold, clammy, agitated
Over 2L (>4 bottles)	Rapid pulse and respiratory rate, low blood pressure, cold, clammy, confused, agitated, aggressive

Causes of postpartum haemorrhage

The most common underlying reasons for primary postpartum haemorrhage are:
- Tone (atonic uterus)
- Trauma (episiotomy, Caesarean section)
- Tissue (retained placenta or membranes)
- Thrombin (abnormal coagulation)
- Anaemia

There are factors that may have occurred in antenatal or intrapartum period which may increase the risk of postpartum haemorrhage:

- Antepartum haemorrhage
- Prolonged labour
- Retained products of conception
- Distended uterus, large baby, polyhydramnios, multiple pregnancy, multiparty, fibroid uterus

[!] Management of primary postpartum haemorrhage is an obstetric emergency as should be managed according to local protocol

- Insert IV cannula
- Massage up contractions in the uterus
- Give IV fluids
- Give oxytocic drug
- Empty the bladder
- Check for placental completeness
- Massage uterus

Table 12.2 Use of oxytocic drugs

Drug	Dose and route	Continuing dose	Maximum dose	Precautions and contraindications
Oxytocin	IV: infuse 20 units in 1L IV fluids at 60 drops/minute IM: 10 units	IV: infuse 20 units in 1L IV fluids at 40 drops/minute	Not more than 3L IV fluids containing oxytocin	
Ergometrine	Give 0.2mg IM or IV (slowly)	Repeat 0.2mg IM after 15 minutes If required, give 0.2mg IM or IV (slowly) every 4 hours	Five doses (total 1.0mg)	High blood pressure Pre-eclampsia Heart disease
Misoprostol	1000 micrograms per rectum		1000 micrograms	

Table 12.3 Causes of vaginal bleeding in the postpartum period

Presenting symptom and other symptoms and signs			
Usually present	**Sometimes present**	**Probable diagnosis**	**Management**
□ Postpartum haemorrhage □ Uterus soft and not contracted	□ Shock	□ Atonic uterus	□ Oxytocics
□ Postpartum haemorrhage □ Uterus contracted	□ Complete placenta delivered	□ Episiotomy □ Tears of cervix, vagina or perineum	□ Suture episiotomy and second-degree tears. □ Third and fourth degree tears should be sutured in theatre
□ Postpartum haemorrhage after delivery	□ Placenta not delivered within 30 minutes after delivery	□ Retained placenta	□ Manual removal of the placenta
□ Portion of maternal surface of placenta missing or torn membranes	□ Postpartum haemorrhage □ Uterus contracted	□ Retained placental fragments	□ Dilatation and curettage
□ Uterine fundus not felt on abdominal palpitation	□ Inverted uterus apparent at the vulva	□ Inverted uterus	□ Manual repositioning of the uterus
□ Pain □ Bleeding occurs more than 24 hours after delivery □ Uterus softer and larger than expected	□ Postpartum haemorrhage □ Bleeding is variable (light or heavy, continuous or irregular) and may be foul smelling	□ Secondary postpartum haemorrhage	□ IV antibiotics □ Exploration of the uterus, dilatation and curettage to ensure no retained placental fragments or membranes
□ Postpartum haemorrhage (bleeding is intrabdominal and/or vaginal) □ Severe abdominal pain	□ Shock □ Tender abdomen □ Fetal parts easily palpable if not delivered	□ Ruptured uterus	

Bimanual compression of the uterus

If bleeding is not controlled after the administration of medication, bimanual compression should be commenced to stop bleeding during transport and referral, to a higher level care facility.

- Tell the woman (and her support person) what is going to be done, listen to her attentively and respond to her questions and concerns.
- Provide continual emotional support and reassurance.
- Insert a gloved hand into the vagina and form a fist.
- Place the fist into the anterior vaginal fornix and apply pressure against the anterior wall of the uterus.
- Place the other hand on the abdomen behind the uterus.
- Press the abdominal hand deeply into the abdomen and apply pressure against the posterior wall of the uterus.
- Maintain compression until bleeding is controlled and the uterus is well contracted.

Management of secondary postpartum haemorrhage

The most common underlying reasons for secondary postpartum haemorrhage are:

- Infection (endometritis)
- Retained pieces of placental tissue or membranes

Treatment of secondary postpartum haemorrhage

- For secondary postpartum haemorrhage, it is important for the woman to be admitted and treated:
  - Give oxytocic drugs (Table 12.3) to stop the bleeding.
  - Explore the uterus to exclude retained placenta and/or membranes.
  - Commence IV antibiotics.
- If anaemia is severe (haemoglobin less than 7g/dL or haematocrit less than 20%), admit for a blood transfusion.
- If there are signs of infection (fever, foul-smelling vaginal discharge), start antibiotics.

Sepsis

Postnatal sepsis is one of the major causes of maternal death and accounts for 15% of all maternal deaths in low- and middle-income countries. If it does not cause death, postnatal sepsis can cause long-term health problems such as chronic pelvic inflammatory disease and infertility. All healthcare providers should be aware of the symptoms and signs of maternal sepsis and critical illness and of the rapid, potentially lethal course of severe sepsis and septic shock. Suspicion of significant sepsis should trigger an urgent referral to secondary care.

Regular observations of all vital signs (including temperature, pulse rate, blood pressure and respiratory rate) should be recorded on a basic observation chart.

Women are more vulnerable to postnatal sepsis if they have experienced or are experiencing:

- Anaemia and/or malnourishment
- Prolonged labour
- Prolonged rupture of the membranes
- Frequent vaginal examinations
- A traumatic delivery
- Caesarean section
- Retained placental fragments

Common causes of infection after delivery:

- Pelvic sepsis
- Wound infection
- Mastitis, breast abscess
- Urinary tract infection
- Phlebitis
- Malaria, enteric fever
- Pneumonia

The following symptoms and signs can occur in postnatal sepsis:

- Fever (temperature of 37.5°C or more)
- General malaise
- Lower abdominal pain
- Tender uterus
- Sub-involution of the uterus
- Purulent, foul-smelling lochia

These signs, including pyrexia, may not always be present and are not necessarily related to the severity of sepsis.

Systemic Inflammatory Response Syndrome is the body's generalised inflammatory response. The criteria are defined as presence of two or more of the following, as can be used as an early warning sign that there may be infection:

- Temperature (>38°C or <36°C)
- Heart rate (>90 beats per minute)
- Respiration rate (>20 breaths/min)
- Abnormal white cell count (<4 >12 10^9/L)
- If the women scores >2 on the scale above, the women should be assessed further using a full systematic symptom screening (general and obstetric).
- Inspection of the perineum and/or speculum examination can be conducted if clinically indicated (for symptoms of vaginal discharge, bleeding, pain) and high vaginal swabs taken.
- Urinalysis can be performed and the full urine sample sent for full culture and microscopy if indicative of a urinary tract infection.
- Blood will be taken for:
  - □ Full blood count, lactate, biochemistry profile, blood culture, malaria
  - □ Syphilis and HIV and TB should all be tested for.

Management

Within first hour:

- Oxygen
- Fluid resuscitation
- IV antibiotics
- Monitor urine output
- Blood cultures and swabs (urine, high vaginal swabs, throat, wound)
- Blood tests (lactate, urea and electrolytes, liver function tests, malaria, coagulation)

Treat unidentified sepsis with a combination of:

- Ampicillin 2g IV 6 hourly
- Gentamicin 5mg/kg IV every 24 hours
- Metronidazole 500mg IV 8 hourly

Consider

- Antimalarials
- Heparin for increased clotting risk
- Retained products

See Chapter 7 for treatment for specific infections.

Pre-eclampsia and eclampsia

The majority of deaths due to pre-eclampsia and eclampsia are avoidable through the provision of timely and effective care to the women presenting with these complications. Pre-eclampsia often occurs during pregnancy but can present for the first time postnatally. It can occur immediately after birth or up to 15-20 days postnatally.

Definitions

- **Pre-eclampsia**: diastolic blood pressure >90mmHg on 2 consecutive readings after 20 weeks' gestation (as above) + proteinuria (2+ on urinalysis).
- **Mild to moderate pre-eclampsia**: as above with no or mild symptoms.
- **Severe pre-eclampsia**: blood pressure >90mmHg as above; proteinuria 3+ or more; and one or more signs or symptoms such as headache, blurring of vision and right upper abdominal pain.
- **Eclampsia**: blood pressure >90mmHg as above; proteinuria >2+; convulsions; other signs and symptoms of severe pre-eclampsia.

Management of a woman with an eclamptic fit:

[!] This is an obstetric emergency

- Place the woman in the left lateral recovery position to prevent aspiration.
- Note the time and duration of fit.
- Commence medication as per Table 12.4
- Insert a Foley catheter, monitor urine output and maintain strict fluid balance chart.
- Restrict fluids to 80ml/hour (26 drops/min) to prevent maternal fluid overload.
- admit as soon as possible to a healthcare facility.

Table 12.4 Use of drugs

Drug	Dose and route	Continuing dose	Maximum dose	Precautions and contraindications
Magnesium sulphate	loading dose of 4g should be given IV over 5 minutes	IV infusion of 1 g/hour maintained for 24 hours	Recurrent seizures should be treated with a further dose of 2-4g given over 5 minutes	Magnesium toxicity should be observed for and treated
Diazepam	0.15-0.25mg per kg (usually 10-20mg) is given by IV injection	The dose can be repeated if necessary after 30 to 60 minutes	Maximum total dose 3mg per kg over 24 hours	Severe or acute respiratory depression

Postnatal investigation, monitoring and treatment

In a woman with gestational hypertension, who has given birth:

- Measure blood pressure daily for the first 2 days after birth.
- Measure blood pressure at least once between day 3 and day 5 after birth.
- Continue the use of antenatal antihypertensive treatment (Table 12.4).
- Consider reducing antihypertensive treatment if blood pressure falls below 140/90mmHg.
- Reduce antihypertensive treatment if blood pressure falls below 130/80mmHg.
- Antihypertensive drugs may be necessary for up to 6 weeks or until the blood pressure returns to normal parameters.
- Continue to test the urine for protein.
- Women with persisting hypertension and proteinuria after 6 weeks may have renal disease and should be admitted for further investigation and management.

Urinary and faecal incontinence

Definition

The complaint of any involuntary leakage of urine or faecal matter.

Many women suffer from some urinary incontinence in the first few months after birth. But, if it persists, it is important to seek medical advice. Women may also have problems with bowel control after childbirth but many fail to seek treatment and advice due to embarrassment.

Obstetric fistula

- If a woman complains of continuous leakage of urine, it is important to exclude vesicovaginal fistula, a hole between the bladder and vagina.
- If faecal incontinence occurs or there is faecal matter in the vagina, a rectovaginal fistula must be ruled out.
- The development of an obstetric fistula has profound effects on both the physical and psychological health of the woman.

The most common obstetric fistulas are:

- **Vesicovaginal**: connection between the bladder and vagina
- **Rectovaginal**: connection between the rectum and vagina
- **Ureterovaginal**: connection between the ureter and the vagina

Vesicovaginal fistula

The most common cause of vesicovaginal fistula in low resource settings is obstetric trauma due to obstructed and prolonged labour. The majority present with continuous leakage of urine, this usually leads to discomfort and excoriation in the genital region.

Screening for obstetric fistula

Examine the vagina, perineum and anus systematically to check for healing, scar tenderness, sphincter tone, or faecal soiling.

Initial assessment should include:

Vaginal speculum examination to assess the integrity of the anterior and posterior vaginal walls. Symptomatic vesicovaginal fistula needs appropriate specialist treatment as spontaneous closure is uncommon. Appropriate treatment will depend on various factors including size and location of the fistula, timing from the event, severity of symptoms, quality of surrounding tissue and clinician's experience and surgical skills. Women who have been diagnosed with an obstetric fistula should have a catheter inserted and be referred to a referral centre with specialist healthcare providers.

Chapter 13: Complications in the newborn baby

In this chapter, you will find information about:

- Respiratory distress (breathing difficulties)
- Meconium aspiration
- Neonatal infection
- Neonatal jaundice
- Prevention and management of hypoglycaemia in the newborn
- Hypothermia
- Preterm birth and low birth weight babies
- Kangaroo mother care
- Care of a newborn baby with birth defects, congenital malformations or birth trauma

Observation of the newborn baby

All newborns that have risk factors should be observed for the conditions listed in Table 13.1. It is essential that all observations are recorded on a basic observations chart and newborns that are unwell are identified early and referred to the appropriate healthcare provider/facility. The table lists the minimum requirements for observation frequency and healthcare providers should use their clinical judgement in each individual case.

Table 13.1 Frequency of newborn observations

Condition	Frequency of observations
Babies born to mothers with one or more risk factors for bacterial infection: ■ Maternal group B streptococcal carriage/infection during current pregnancy (with or without intrapartum antibiotic prophylaxis) ■ Previous affected child with group B streptococcal sepsis ■ Prelabour rupture of membranes (>24 hours) ■ Spontaneous preterm labour (<37 weeks) ■ Intrapartum fever (>37.5°C) ■ Chorioamnionitis	1 hour, 6 hours, 12 hours of age
Receiving antibiotics for suspected or proven infection.	Observations as above for first 12 hours, then 4 hourly during treatment
At risk of hypoglycaemia (<37 weeks, <10th centile, infant of diabetic mother)	Observations required before 3 hourly feeds until glucose measurements are stable
Meconium stained liquor If there is grade 1 meconium	After birth, observe at 1 and 2 hours
If there is grade 2 or 3 meconium	Observations should be performed at 1 and 2 hours of age and then 2 hourly for a further 10 hours
Newborn causing other concerns	Use clinical judgement

Breathing difficulties in the newborn baby

Signs of respiratory distress or breathing difficulties in the newborn

Normally, the newborn's respiratory rate is 30 to 60 breaths per minute. Respiratory distress in the newborn is recognised as one or more signs of increased work of breathing:

- Increased respiratory rate >60 breaths per minute
- Nasal flaring
- Chest in-drawing
- Grunting

Treatment

It is essential that newborns with breathing difficulties are referred for further treatment as soon as possible. Commencing oxygen can be a lifesaving intervention and should be commenced immediately (if possible) whilst awaiting referral/review by the appropriate healthcare provider.

Oxygen is needed in young infants with any of the following:

- Central cyanosis or low oxygen saturations of <92% in room air
- Respiratory distress (respiratory rate >60 respirations per min)

Table 13.2 Method of oxygen administration

Method	Flow and concentration
Nasal prongs	■ Low = 0.5L/min ■ Moderate = 0.5L-1L/min ■ High = more than 1L/min
Nasal catheter	■ Low = 0.5L/min ■ Moderate = 0.5L-1L/min ■ High = more than 1L/min

Meconium aspiration in the newborn

Meconium is the early faeces (stool) passed by a newborn soon after birth, before the baby has started to digest breast milk (or formula). In some cases, the baby passes meconium while still inside the uterus. This usually happens when babies are under stress when the supply of blood and oxygen decreases, often due to problems with the placenta.

Once the meconium has passed into the surrounding amniotic fluid, the baby may breathe meconium into the lungs. This may happen while the baby is still in the uterus, or still covered by amniotic fluid after birth. The meconium can also block the infant's airways right after birth. This condition is called meconium aspiration. It can cause breathing problems due to swelling (inflammation) in the baby's lungs after birth.

Management

At birth, if the baby is active and crying, no treatment is needed. If the baby is not active and crying right after delivery, the newborn’s vocal cords should be examined to check for meconium. If meconium is seen, a suction catheter is placed in the infant's trachea and suction is applied as

the tube is pulled out. This procedure may be repeated until meconium is no longer visible in the suction contents. It is important to use the correct size of suction catheter for this:

- Normal size/term newborn, size 10
- Low birth weight/preterm newborn, size 7 or 8

The infant should be stimulated and dried and if active resus is required this should be commenced after suction has taken place (Chapter 10). If the newborn has aspirated meconium and needs treatment, referral and admission to a high dependency newborn unit is required. Depending upon the condition of the newborn treatment may include:

- Continuous positive airway pressure therapy to keep the baby's lungs inflated +/- mechanical ventilation
- Antibiotics to treat infection
- Radiant warmer to maintain body temperature
- IV fluids if newborn unable to breastfeed (Table 13.5)

Neonatal infection

Early identification of newborn infections with prompt and appropriate antibiotic treatment will substantially reduce mortality due to newborn sepsis and pneumonia. Newborns with serious infections need to be treated with antibiotics and provided with supportive care in hospitals.

Definition

Early onset sepsis (1-7 days after birth) is due to the infection mostly acquired during delivery.

Many early newborn infections can be prevented by:

- Avoiding unnecessary separation of the newborn from the mother e.g. baby unit
- Handwashing before delivering and handling the infant
- Good basic hygiene and cleanliness during delivery (e.g. chlorhexidine cream for all maternal vaginal examinations)
- Appropriate umbilical cord care

Late onset sepsis (after seven days) can be acquired at the hospital or at home.

Many late onset newborn infections can be prevented by:

- Exclusive breastfeeding
- Strict procedures for handwashing or alcohol hand rubs for all staff and for families before and after handling newborn babies
- Using Kangaroo mother care and avoiding use of incubators for preterm infants.
- Strict sterility for all procedures
- Clean injection practices
- Removing intravenous drips when they are no longer necessary

Risk factors for infection:

- Membranes ruptured >18 hours before delivery
- Mother had a fever of >37.5°C before delivery or during labour
- Amniotic fluid that is foul smelling or purulent

Causes of neonatal infection

- Preterm prelabour rupture of membranes
- Dehydration
- Infection cord
- Pneumonia
- Urinary tract infection
- HIV

Clinical observations and symptoms indicating infection

The following are all signs of severe infection and/or sepsis. If one or more signs present, provide emergency stabilising treatment refer and admit for further examination and management. Most babies with sepsis will have a fever (temperature >37.5°C) but this is not always the case. The baby can also be cold (temperature <36°C) when very ill. Chart all observations on a chart for early identification and treatment of sepsis.

- Fever >37.5°C
- Low temperature <36°C
- Respiratory rate less than 20 per minute or apnoea (cessation of breathing for >15 seconds)
- Respiratory rate greater than 60 per minute

Presentation of signs of infection

- Unable to breastfeed
- Bulging anterior fontanelle
- Convulsions
- Drowsy or unconscious
- High pitched cry
- Grunting
- Severe chest in-drawing
- Central cyanosis
- Generalized body stiffness
- Deep jaundice
- Severe abdominal distension
- Severe skin pustules

Signs of localised infections

- Less than 10 skin pustules
- Redness extending to the peri-umbilical area
- Umbilicus draining pus
- Oral thrush
- Painful/warm swollen joints
- Eye discharge

Management

It is essential that antibiotics are given after the newborn has been reviewed and prescribed antibiotics by the appropriate healthcare provider. Most drugs in newborns are dosed according

to body weight (mg/kg). Refer to local paediatric guidelines or WHO country specific guidelines for dosage and frequency of medication.

Prophylactic antibiotics for infants at risk of infection

- Ampicillin IM or IV and gentamicin for at least two days
- After two days, the newborn should be reassessed and treatment continued only if there are signs of sepsis or a positive blood culture.

Antibiotics for suspected neonatal sepsis

- Newborns with signs of sepsis should be treated with ampicillin (or penicillin) and gentamicin as the first line antibiotic treatment for at least 10 days.
- If a newborn with sepsis is at greater risk of staphylococcus infection (e.g. extensive skin pustules, abscess, or omphalitis in addition to signs of sepsis), they should be given cloxacillin and gentamicin instead of penicillin and gentamicin.
- Where possible, blood cultures should be obtained before starting antibiotics.
- If an infant does not improve in two to three days, antibiotic treatment should be changed, or the infant should be referred for further management.

Table 13.3 Antibiotic treatment for infections in newborns

Antibiotic	Dose
Amoxycillin	IM/IV: 50mg/kg every 12 hours
Gentamicin	Low birth weight infants: IM/IV: 3mg/kg once a day Normal birth weight: IM/IV: 5mg/kg once a day

Newborns identified with clinical severe infection whose families do not accept or cannot access hospital care should be managed in outpatient settings by an appropriately trained healthcare worker with one of the two following regimens:

- Gentamicin IM 5-7.5mg/kg (for low birth weight newborns Gentamicin IM 3-4mg/kg) once daily for seven days and twice daily oral amoxicillin, 50mg/kg per dose for seven days. Close follow-up is essential.
- Gentamicin IM 5-7.5mg/kg (for low birthweight newborns gentamicin 3-4mg/kg) once daily for two days and twice daily oral amoxicillin, 50mg/kg per dose for seven days. Close follow-up is essential. A careful assessment of the child on day 4 is mandatory for this option in order to determine if the child is improving.

Ophthalmia neonatorum

Ophthalmia neonatorum refers to any conjunctivitis occurring in the first 28 days of life. It is most commonly infective in origin. Bacterial causes include Neisseria gonorrhoeae; Chlamydia trachomatis, Staphylococcus aureus, Streptococcus pneumoniae. Less frequently, there are viral causes, notably the herpes simplex virus. If it occurs as a reaction to chemical irritants, it will be a self-limiting condition lasting no more than 24 to 36 hours. All infections need treatment.

In most cases, ophthalmia neonatorum is a mild illness. The exception is infection due to gonococcal infection, which can progress rapidly to corneal damage and permanent visual impairment. This may also cause systemic complications.

Diagnosis

- Eyes are red
- Discharge
- Light sensitive

The majority of newborn babies presenting with a sticky discharge have a benign cause, most frequently due to blocked nasolacrimal.

Features suggestive of gonococcal involvement include:

- Conjunctival redness, especially if the bulbar conjunctiva (overlying the sclera) is involved.
- Onset is sudden and severe.
- Both eyes are affected.

Summary

- Use universal precautions to prevent neonatal infections.
- Risk factors are maternal infection, prolonged rupture of membranes, small-for-age, asphyxia, hypothermia.
- Know the danger signs.
- Discriminate between localised and generalised infection and treat appropriately.
- Identify newborn babies at risk for congenitally transmitted infections.

Management

- Show the mother how to wash the eyes with water/breast milk and to put ointment into the eyes.
- The mother must wash her hands before and after doing so.
- Tell the mother to wash the eyes and administer eye ointment four times a day for 5 days.
- Give the mother a tube of tetracycline or chloramphenicol eye ointment to treat the child.
- Review 48 hours after starting treatment if the child is not improving.

Severe conjunctivitis (a lot of pus and/or swelling of the eyelids) is often due to gonococcal infection.

- Treat as inpatient, as there is a risk of blindness, and twice daily review is required.
- Wash the eyes to clear as much pus as possible.
- Give ceftriaxone (50mg/kg up to a maximum total dose of 150mg).

Swollen, red eyelids with pus

- Give ceftriaxone (50mg/kg up to a maximum total dose of 150mg).
  OR
- Kanamycin (25mg/kg up to a maximum total dose of 75mg IM once), according to national guidelines.
- Use as described above: tetracycline eye ointment or chloramphenicol eye ointment
- Treat the mother and her partner for sexually transmitted infections: amoxicillin, spectinomycin or ciprofloxacin for gonorrhoea and tetracycline for Chlamydia, depending on the resistance pattern in the country.

Congenital syphilis

Clinical signs

- Often low birth weight
- Palms and soles: red rash, grey patches, blisters or skin peeling
- 'Sniffles': highly infectious rhinitis with nasal obstruction
- Abdominal distension due to enlarged liver and spleen
- Jaundice
- Anaemia

Some very low birth weight babies with syphilis have signs of severe sepsis with lethargy, respiratory distress, skin petechiae or other bleeding. If you suspect syphilis, do a venereal disease research laboratory test, if possible.

Treatment

- Asymptomatic newborn babies born to women who test positive test for syphilis should receive 37.5mg/kg (50,000U/kg) of benzathine benzylpenicillin in a single IM dose.
- Symptomatic infants can be treated with:
  - Procaine benzylpenicillin at 50mg/kg as a single dose by deep IM injection daily for ten days or
  - Benzylpenicillin at 30mg/kg every 12 hours IV for the first seven days of life and then 30mg/kg every 8 hours for a further 3 days

Treat the mother and her partner for syphilis and check for other sexually transmitted infections.

Neonatal jaundice

Definition

Yellow coloration of skin and mucous membranes.

More than 50% of normal newborns and 80% of preterm infants have some jaundice. Jaundice may be normal (physiological) or abnormal (pathological). Physiological jaundice does not need treatment. Continue breastfeeding even when the baby is sleepy. This is due to the physiological breakdown of the large red blood cell mass babies may have immediately after birth. Pathological jaundice needs treatment of the underlying cause(s) and may need phototherapy or exchange transfusion.

Physiological jaundice

- The baby is generally otherwise completely well.
- Sets in on day 3 after birth.
- Disappears within 2 weeks.
- Common in babies, especially in preterm babies.

Actions

- Educate the mother/caregiver to watch out for danger signs.
- Continue breastfeeding until the baby looks and feeds well.

Pathological jaundice

- Jaundice starts on the first day of life.
- Jaundice lasts longer than 14 days in term newborn babies, 21 days in preterm infants.
- Jaundice accompanied with fever or other signs of illness.
- Deep jaundice: palms and soles of the newborn are deep yellow.

Actions

- Look for the cause and treat accordingly.

Causes of pathological jaundice

Pathological

- Serious bacterial infection
- Blood group (Rhesus and ABO) incompatibility
- Congenital syphilis
- Intrauterine infection
- Liver disease, hepatitis

Management

Management of jaundice is based on the level of serum bilirubin. Newborns who need treatment should be referred to an appropriate healthcare facility and treated with phototherapy (See Table 13.4).

Table 13.4 Serum Bilirubin treatment levels

	Phototherapy			
	Healthy term baby		Preterm or any risk factor	
Day	mg/dl	mmol/L	mg/dl	mmol/L
1	Any visible jaundice		Any visible jaundice	
2	15	260	13	220
3	18	310	16	270
>4	20	340	17	290

Neonatal hypoglycaemia

Definition

This occurs when the blood glucose level is below 2.6mmol/L (45mg/dl) irrespective of gestation and postnatal age.

Diagnosis

Neonatal hypoglycaemia may be asymptomatic especially in preterm babies. Signs and symptoms include:

- Jitteriness
- Sweating
- Convulsions
- Apnoea
- Cyanosis
- Hypotonia

Risk factors associated with hypoglycaemia

- Preterm (<37 weeks)
- Low birth weight (<2.5kg at birth)
- Intrauterine growth restriction
- Baby of diabetic mother
- Temperature Instability
- Systemic Infection

Prevention and management of hypoglycaemia in babies

- Promote skin-to-skin contact and early breastfeeding, ideally within the first hour.
- Use of ongoing skin-to-skin contact to support thermal control, emotional wellbeing and breastfeeding (where this is chosen method of feeding).
- Support mothers to recognise signs of willingness for feeding (such as rooting, lip licking, hands moving to mouth, arm and leg movements, eye rolling prior to waking.)
- Encourage frequent feeds, at least 3 hourly, but more frequently if baby is showing signs of hunger.
- Support breastfeeding mothers to recognise signs of effective positioning and attachment and signs of effective feeding, at each feed.
- Support formula feeding mothers to develop an effective technique for bottle feeding, ensuring adequate volume of intake to maintain blood glucose at an acceptable level. At least three hourly feeds are required

Management of hypoglycaemia

Blood glucose less than 1.1mmol/L (25mg/dl)

- Give a bolus of 2ml/kg body weight of 10% glucose IV slowly over five minutes.
- If an IV line cannot be established quickly, give 2ml/kg body weight of 10% glucose by gastric tube.
- Infuse 10% glucose at the daily maintenance volume according to the baby's age.

- Assess the blood glucose 30 minutes after the bolus of glucose.
  - If the blood glucose is less than 1.1mmol/L (25mg/dl), repeat the bolus of glucose (above) and continue the infusion then assess blood glucose again after 30 minutes.
  - If the blood glucose is between 1.1mmol/L (25mg/dl) and 2.6mmol/L (45mg/dl) continue the infusion and repeat the blood glucose testing every three hours until the blood glucose is 2.6mmol/L (45mg/dl) or more on two consecutive tests.
  - Allow the baby to breastfeed. As the baby's ability to feed improves, slowly decrease (over a three-day period) the volume of IV glucose while increasing the volume of oral feeds. Do not discontinue the glucose infusion abruptly.

Blood glucose between 1.1-2.6m/mmol/L (25-45mg/dl)

- If the blood glucose is between 1.1mmol/L (25mg/dl) and 2.6mmol/L (45mg/dl), allow the baby to breastfeed and repeat the blood glucose testing every three hours until the blood glucose is 2.6mmol/L (45mg/dl) or more on two consecutive tests.
- Once the blood glucose is 2.6mmol/L (45mg/dl) or more for two consecutive tests:
  - If the baby cannot breastfeed, give expressed breast milk using an alternative feeding method.

Frequency of blood glucose measurements after blood glucose returns to normal

- If the baby is receiving IV fluid for any reason, continue blood glucose testing every 12 hours for as long as the baby requires IV fluid. If the blood glucose is less than 2.6mmol/L (45mg/dl), treat as described above.
- If the baby no longer requires or is not receiving IV fluid, assess blood glucose every 12 hours for 24 hours (two more tests):
  - If the blood glucose remains normal, discontinue testing.

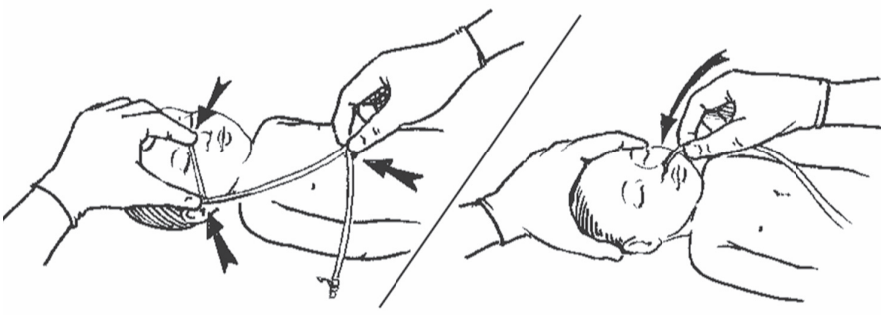
Nasogastric feeding and IV fluids

If a newborn is unable to feed orally, give expressed breast milk by nasogastric tube.

Insertion of a nasogastric tube

- Hold the tip of the tube against baby's nose.
- Measure distance from nose to earlobe, then to epigastrium. Mark tube at this point.
- Hold baby firmly.
- Lubricate tip with water. Pass it directly into one nostril, pushing slowly.
- The tube should pass easily down into stomach without resistance.
- When the measured distance is reached, affix the tube with tape at nose.

Figure 13.1 Insertion of a nasogastric tube



Aspirate a small amount of stomach contents with a syringe to confirm tube is in place (check that it turns blue litmus paper pink). If no aspirate is obtained, inject air down the tube and listen over the abdomen with a stethoscope. If in doubt about the location of tube, withdraw and start again. When the tube is in place, affix a 20ml syringe (without the plunger) to end of tube. Pour food or fluid into syringe, allowing it to flow by gravity.

IV fluids should be given in the following acute phase in newborn:

- If there is bowel obstruction, necrotizing enterocolitis, or the feeds are not tolerated e.g. indicated by increasing abdominal distension or vomiting everything.
- In newborn babies who are lethargic, unconscious or having frequent convulsions.

If IV fluids are given

- Reduce the rate as the volume of oral or gastric milk feeds increases. IV fluids should ideally be given with an inline burette to ensure the exact doses of fluids prescribed.
- It is essential that these infants are referred for specialist assessment and treatment. For the first 24 hours, 10% dextrose can be used.
- After this period, the newborn will need specially prepared IV fluids.

Table 13.5 Administration of IV fluids to a newborn

Day	ml/kg/day
1	60
2	80
3	100
Then slowly increase to 150ml/kg per day.	

Congenital malformations

Definition

These are abnormalities that a baby may be born with. They are varied and may be major or minor.

Diagnosis

All babies should be examined soon after birth to rule out congenital abnormalities (Chapter 10).

In all cases of birth defects:

- Counsel parents in all cases.
- Counsel both parents at the same time wherever possible.
- Have the most qualified healthcare provider talk to the parents.
- Ensure honesty, sensitivity and empathy is shown by all staff.
- Parents should be shown any obvious defect on the baby and the implications explained to them.
- Current and future management should be discussed.
- Link with any community support groups should be made.

Life threatening conditions

These include:
- Gastrointestinal obstruction e.g. tracheoesophageal fistula, upper gastrointestinal obstruction, imperforate anus.
- Gross cardiac defects.

Prevention
- Avoid unnecessary drugs and X-rays in pregnancy.
- To prevent spina bifida, encourage the use of folate 400 micrograms daily before pregnancy, encourage an adequate diet at all times.

Oesophageal atresia and tracheoesophageal fistula
This occurs when there is atresia of oesophagus with connection of the oesophagus to the trachea. This is a life-threatening condition.

Symptoms
- Copious amounts of mucus from the mouth.
- Baby turns blue when feeding is attempted.

Management
- Do not continue to try to feed baby, but start IV fluid.
- Attempt to pass nasogastric tube and suction gently.
- Refer to a tertiary hospital or specialised centre for further management.

Imperforate anus
- This occurs when there is no anal opening.
- It can be diagnosed by inspection and subsequent failure to insert a thermometer.

Management
- Establish an IV line, and give only IV fluid at maintenance volume according to the baby's age.
- Ensure that the baby does not receive anything by mouth.
- Insert a nasogastric tube and ensure free drainage.
- Urgently refer the baby to an appropriate healthcare facility for surgery.

Omphalocele
This occurs when the abdominal wall does not close fully and remains open. There is a thin layer covering the bowel.

Management
If the defect is not covered by skin:
- The baby can be fed with breast milk
- Cover with warm sterile saline gauze to reduce fluid and heat loss and to give a degree of protection.
- Keep gauze moist at all times, and ensure that the baby is kept warm.
- Refer the baby urgently to a tertiary hospital or specialised centre for surgery.

Gastroschisis

This occurs when the abdominal wall does not close fully and remains open. In gastroschisis, there may be exposed bowel.

- Establish an IV line and give IV fluid only at a maintenance volume according to the baby's age.
- Start antibiotic treatment.
- Insert a nasogastric tube, and ensure free drainage.
- Refer the baby urgently to a tertiary hospital or specialised centre for surgery.

Spina bifida

This occurs when there is a defect in the vertebral column.

Management

- If the defect is not covered by skin:
  - Cover with sterile gauze soaked in sterile normal saline.
  - Keep the gauze moist at all times and ensure that the baby is kept warm.
  - If ruptured, give Benzylpenicillin 50,000units/kg 12 hourly and Gentamicin 5mg/kg daily for 5 days.
- Refer the baby to a tertiary hospital or specialized centre for further evaluation or surgical care.

Cleft lip and palate

There is a defect in the upper lip that may be accompanied by a defect in the palate.

Management

- The mother needs to be told that feeding is important to ensure adequate growth until surgery can be performed.
- Show the mother how to feed the baby with breast milk.
  - Note that babies with minor clefts can breastfeed.
  - However, those with bilateral clefts must be fed by cup and spoon.
- Take care to prevent aspiration.
- Refer to a tertiary hospital or special centre for surgery.

Talipes equinovarus

This is a deformity of the foot where the ankle is turned downwards and the front part of the foot is turned inwards. This may be known as "club foot".

Management

- Refer as the baby will need a plaster of paris cast to correct the growth of the foot. Regular follow-up visits will be needed.

Hydrocephaly

This occurs when there is an unusually large head arising from blockage in the free flow of cerebrospinal fluid in the ventricular system. It is diagnosed antenatally by ultrasound scan or at the newborn examination after birth.

Diagnosis
Babies born with hydrocephalus (congenital) often have distinctive physical features.

These can include:
- An unusually large head (>37cm)
- A thin and shiny scalp with easily visible veins
- A bulging or tense fontanelle (the soft spot on top of a baby's head)
- Downward looking eye

Management
- Monitor head circumference
- Refer to a tertiary level hospital or specialised centre early for surgical cerebrospinal fluid drainage

Down's syndrome
Down's syndrome is caused by a random error in cell division that results in the presence of an extra copy of chromosome 21. In the majority of cases, the error occurs randomly during the formation of an egg or sperm. No behavioural activity of the parents or environmental factor is known to cause Down's syndrome.

Diagnosis
Newborns that have Down's Syndrome often have distinctive physical features.
- Floppiness (hypotonia)
- Eyes that slant upwards and outwards
- A small mouth with a tongue that may stick out
- A flat back of the head
- Below average weight and length at birth
- The palms may have only one crease across it

Management
- Newborns with Down's syndrome may need additional support with breastfeeding due to poor muscle tone and a protruding tongue.
- All children with Down's syndrome have some degree of learning disability and delayed development, but this varies widely between individual children. Children with Down's syndrome may be slower to learn skills such as sitting, standing, walking and talking. They will develop these skills but it will occur at a slower than normal rate.

Preterm birth and low birth weight

Low birth weight is defined as a weight between 1.5-2.5kg. Babies <2.5kg can usually be managed safely at home with some extra care and support.

Very low birth weight

Newborn babies with a birth weight less than 1.5kg are classified as very low birth weight. Suckling, swallowing and breathing are not well coordinated, so these babies require special attention in order to feed them adequately and safely. Very low birth weight babies also have great difficulty in maintaining their body temperature, so they are at increased risk of hypothermia. These babies need care in a high dependency newborn unit and should be referred immediately to a hospital with high dependency facilities for very small newborns.

Characteristics of preterm and low birth weight babies

- The nervous system not yet well developed.
- There is little fat under the skin; especially brown fat which is found mainly over the shoulders, back, kidneys, neck and armpits and is very important to generate heat for the newborn baby.
- Lie very still so the baby cannot generate heat by moving much.
- There is a high ratio of surface area to body weight compared to that of a child or adult, so lose heat quickly from their skin.
- Immature lungs, breathing problems.
- Low immunity, extra vulnerable to infection.
- Weak and unable to feed well.

Low birth weight babies are more at risk of:

- Breathing problems
- Hypothermia
- Sepsis
- Feeding difficulties/hypoglycaemia
- Jaundice
- Bleeding

Table 13.6 Classification of newborn babies according to birth weight and gestational age

Birth weight and gestational age	Classification	Management
Weight <1.5kg	Very low birth weight	Refer urgently to a hospital, making sure to keep the newborn baby warm on the journey.
Gestational age <32 weeks	Very preterm	Keep the newborn warm and refer it urgently to a hospital.
Weight 1.5-2.5kg	Low birth weight	If there is no other problem, counsel on optimal breastfeeding, prevention of infection and keeping the newborn baby warm.
Gestational age 32-36 weeks	Preterm	Treat as above for low birth weight newborns.
Weight >2.5kg; gestational age ≥37 weeks	Normal weight and full term	Treat as above for low birth weight and preterm newborns.

Hypothermia

Definition

Normal axillary temperature is 36.5-37.5°C. In hypothermia, the temperature is below 36.5°C.

- Cold stress 36.0°C to 36.4°C
- Moderate hypothermia 32.0°C to 35.9°C
- Severe hypothermia <32°C

All newborns but particularly those born preterm have great difficulty in maintaining their body temperature. Newborns very easily lose heat leading to hypothermia which is life threatening.

Recording temperature

- Axillary temperature is as reliable as rectal and probably safer (less risk of injury or infection).
- Axillary temperature: Place the bulb of thermometer against the roof of dry axilla, free from moisture. Hold the newborn's arm close to the body to keep thermometer in place. The temperature is read after three minutes.
- Rectal temperature: Do not use this method for routine monitoring. However, it is the best guide for core temperature in cold (hypothermic) sick newborn babies. It is recorded by inserting the greased bulb of the thermometer backwards and downwards to a depth of 3cm in a term baby (2 cm in a preterm baby). Keep the thermometer in place at least for 2 minutes.

Factors leading to hypothermia

Hypothermia may be caused by environmental factors, sepsis, intracranial haemorrhage or a combination of these. The risk factors for hypothermia include:

- Maternal hypertension
- Caesarean delivery
- Low birth weight
- Low Apgar scores

Prevention of hypothermia

- Hypothermia can be prevented by immediately drying and then putting the newborn in skin-to-skin contact with the mother.
- Covering the newborn and the mother in a warm blanket to prevent evaporative, conductive and convective losses. The newborn's **head** needs to be well covered, because more than 90% of the heat loss is through the head if it is left uncovered.
- Preterm very low birth weight infants also benefit from a polyethylene occlusive wrapping at the time of delivery.
- A newborn baby exposed for resuscitation or observation should be placed under a radiant warmer to prevent radiant losses.
- Sick newborn babies should be maintained in a neutral thermal environment to minimize the metabolic rate.
- Delay bathing for at least 24 hours after delivery and use warm water.

Kangaroo mother care

Definition

Kangaroo mother care has been shown to be an extremely effective method of caring for sick term babies, preterm and low birth weight babies. It involves holding the baby in skin-to-skin contact, day and night, on the chest of the mother (or another responsible person if the mother is unable to do it all the time).

Evidence shows that using Kangaroo mother care to support preterm and low birth weight newborns results in greater stability of the newborn baby's heart rate and breathing, lower rates of infection and increased weight gain. In the mother, it results in increased breast milk supply and she is more likely to succeed in exclusive breastfeeding.

Benefits

- Breastfeeding: Kangaroo mother care increases breastfeeding rates as well as increasing the duration of breastfeeding.
- Thermal control: Prolonged skin-to-skin contact between the mother and her baby provides effective temperature control with a reduced risk of hypothermia.
- Early weight gain: Tiny newborn babies gain more weight when receiving Kangaroo mother care than not receiving Kangaroo mother care.
- Less morbidity: Newborns receiving Kangaroo mother care have more regular breathing and are less likely to stop breathing and it reduces risk of infections
- Reduces oxygen requirement.

The healthcare provider needs to explain Kangaroo mother care to the mother and follow the steps below:

Preparations for Kangaroo mother care

- Make sure the room is warm.
- Request the mother to sit or recline comfortably.
- Undress the baby gently, except for a cap, nappy and socks.
- Place the baby lying flat, facing the mother's chest in an upright and extended posture, between the mother's breasts, in skin-to-skin contact.
- Turn the baby's head to one side to keep the airways clear.
- Cover the baby with the mother's shawl, or gown; wrap the newborn baby and mother together with an added blanket, and put a cap on the newborn's head.
- Breastfeed the baby frequently, at least 8-12 times a day.
- Keep the newborn baby in this position for 24 hours every day except for brief breaks.

The mother should be informed that the newborn should stay in Kangaroo mother care continually except for hygiene, cord care and neonatal examinations.

At every postnatal assessment:

- Count the newborn baby's respiratory rate and make sure there is no fast breathing >60 respirations/min
- Observe that the newborn is breastfeeding optimally.
- Measure the newborn's axillary temperature and make sure it is normal, >36.5°C.

Kangaroo mother care should continue for as long as possible, or until the gestational age reaches term (40 weeks) or the newborn baby's weight reaches 2.5kg. If the newborn weighs >1.8kg and its temperature is stable, there are no respiratory problems and the newborn is feeding well, it can be safely weaned from Kangaroo mother care before 40 weeks.

Chapter 14: Psychosocial ill-health during and after pregnancy

In this chapter, you will find information about:

- Screening for mental health: changes in feelings and emotions, worry, fear and difficulty
- Initial management of depression, suicidal ideation and psychosis
- Screening and support for women who report domestic violence
- Support for women who have had an adverse event during or after pregnancy

Introduction

Psychological ill-health during and after pregnancy can have serious consequences for the health and wellbeing of a mother and her baby, as well as for her partner and other family members.

Women with psychological ill-health may feel stigmatised and are less likely to engage with healthcare providers. Newborn babies are dependent on their mothers for breastfeeding, physical care, comfort and social interaction. The development of the newborn baby is compromised if a mother is insensitive or unresponsive to the baby's behavioural cues and needs.

In low- and lower-middle-income countries, maternal depression is associated with higher rates of malnutrition and stunting, diarrhoeal diseases, infectious illnesses, hospital admissions, lower birth weight and reduced completion of immunisation schedules among infants.

Treatment and care for psychological ill-health should take into account the woman’s individual needs and preferences. Women with psychological ill-health during and after pregnancy should have the opportunity to make informed decisions about their care and treatment in partnership with their healthcare providers. Good communication between healthcare providers and women, their husbands/partners, and family is essential. The treatment, care and information women are given regarding psychological ill-health should be culturally appropriate.

Screening for psychological ill-health

A significant number of women experience psychological ill-health such as anxiety and depression during pregnancy. Up a fifth of pregnant women experience serious feelings of stress, anxiety or depression. The majority of women who experience postnatal depression, also experience antenatal depression, and similarly postnatal anxiety is often preceded by antenatal anxiety.

Through screening, it is possible to identify women who have a high risk of depression. The healthcare provider can ask a series of questions to explore whether women may have, psychological ill-health. Women can then be referred and assessed by a specialised healthcare provider.

It is important that the healthcare provider understands that women who have psychological ill-health may be:

- Unwilling to disclose or discuss their problem because of fear of stigma, negative perceptions of them as a mother
- Reluctant to engage with the healthcare provider

Whooley questions for depression screening

The Whooley questions offer a relatively quick and convenient way of screening for healthcare providers who are not specialists in mental health. The questions are a screening tool which is designed to try and identify two symptoms that may be present in depression (Appendix 4).

Healthcare providers can ask:

- Two questions at a woman's initial contact with maternity services
- Twice more during pregnancy, at the postnatal first contact
- At six weeks' postnatal.

1. During the past month, have you often been bothered by feeling down, depressed or hopeless?
2. During the past month, have you often been bothered by little interest or pleasure in doing things?

A third question should be considered if the woman answers 'yes' to either of the initial questions,

3. Is this something you feel you need or want help with?

Answering yes to one or both questions means that the woman requires further evaluation. If the woman answers no to both questions it means that she is not depressed. The Whooley questions cannot be used to diagnose or measure the severity of depression. After identifying a possible mental disorder in a woman during pregnancy or the postnatal period, further assessment should be considered in consultation with colleagues, if necessary. Women should be advised that they can access care at any stage if they feel they need help with their mental health.

Edinburgh Postnatal Depression Scale

The Edinburgh Postnatal Depression Scale (Appendix 5) is a questionnaire originally developed to assist in identifying possible symptoms of depression in the postnatal period. It also has adequate sensitivity and specificity to identify depressive symptoms in the antenatal period and is useful in identifying symptoms of anxiety. The Edinburgh Postnatal Depression Scale is not a diagnostic tool; rather it is a screening tool that aims to identify women who may benefit from follow-up care, such as a further mental health assessment, which may lead to a diagnosis based on accepted diagnostic criteria.

The Edinburgh Postnatal Depression Scale is a 10-item questionnaire. Women are asked to answer each question in terms of the past seven days. A score is calculated by adding the individual items as indicated below for each question (note that some items have reversed scoring). Complete the Edinburgh Postnatal Depression Scale at least once, preferably twice, in both the antenatal period and the postnatal period (ideally 6-12 weeks after the birth).

A total score of 13 or more means that there is a need for follow-up to assess if there are possible depressive symptoms. Scores may be influenced by several factors, including the woman's understanding of the language used, their fear of the consequences if depression is identified, and differences in emotional reserve and perceived degree of stigma that is associated with depression.

If a woman discloses thoughts of self-harm or suicide:

- Assess whether the woman has adequate social support and is aware of sources of help
- Arrange help appropriate to the level of risk
- Inform all relevant healthcare providers
- Advise the woman, her husband/partner and family to seek further help if the situation deteriorates

Transition to parenthood

The birth of a new baby can sometimes place stress on relationships. The transition to becoming a parent can be challenging and may often involve the loss of control and disruption to relationships.

Healthcare providers can:

- Recognise that some women may experience difficulties with the mother-baby relationship
- Assess the nature of this relationship, including verbal interaction, emotional sensitivity and physical care during the postnatal visits
- Offer help, advise and support when required

Postnatal depression

After birth is a recognised time for the development of serious mood disorders and depression, these include:

- Postnatal blues
- Postnatal depression
- Puerperal (postnatal) psychosis

Each of these have a different clinical presentation, and management which are outlined in Table 14.1 below.

Table 14.1 Postpartum affective disorders: summary of onset, duration and treatment

Disorder	Prevalence	Onset	Duration	Treatment
Postnatal "blues"	30-75%	Hours to days	3 or 4 days	No treatment required other than reassurance
Postnatal Depression	10-15%	Weeks – months	12 months	Treatment usually required within 2 weeks
Puerperal Psychosis	0.1-0.2%	Sudden onset within days to weeks		Hospitalisation usually required

Postnatal blues

Many women go through a period of mild depression following the birth of a baby. There is a need to differentiate between postnatal 'blues' (feeling down) which usually occur in the first week and can last up to two weeks after birth, and postnatal depression which is much more severe and usually lasts for a longer period.

Symptoms

- Cries easily
- Feels tired, agitated or irritable all the time
- Lacks motivation
- Experiences disturbed sleep
- Lack of or increased appetite
- Lacks sexual desire

Management

Postnatal blues are usually mild, last for a short period and do not require treatment other than reassurance, the symptoms usually stop within a few days.

Postnatal depression

Depression can vary from mild to severe and it can affect women in different ways. Many women may not realise they have postnatal depression, as it can develop gradually. Postnatal depression can start any time in the first year after giving birth.

Symptoms

- A persistent feeling of sadness and low mood
- Loss of interest in life, no longer enjoying things that used to give pleasure
- Lack of energy and feeling tired all the time
- Trouble sleeping at night and feeling sleepy during the day
- Difficulty bonding with the baby
- Withdrawing from contact with other people
- Difficulties with concentration and making decisions
- Low self confidence
- Poor appetite or an increase in appetite ('comfort eating')
- Feeling very agitated or, alternatively, very apathetic
- Feelings of guilt and self-blame
- Thinking about self-harm or suicide

Management

Postnatal depression can be treated. It is a temporary illness from which recovery is expected with appropriate treatment and support. The treatment is likely to depend on severity of the depression. Postnatal depression can be distressing and frightening for the woman, her partner and family, but support and effective treatments are available.

These include:

- Self-help: the woman can talk to her family and friends about her feelings and what they can do to help; making time for herself, resting and getting as much sleep as possible, regular exercise and eating healthily.
- Psychological therapy: refer to a specialist for a course of counselling or cognitive behavioural therapy.
- Antidepressants: Antidepressant medication that is safe to use whilst breastfeeding is available.

Support

- Women who feel depressed need emotional support.
- The healthcare provider can reassure them that this is usually a temporary condition due to the physical and hormonal changes taking place in the body.
- It sometimes helps if women know that feeling depressed following the birth of a baby is normal and many women experience these feelings.
- The healthcare provider can discuss the situation with the woman's family and explain to them the need for extra support at this time.
- Verify that the mother and the newborn are getting the care they need.

Puerperal psychosis

Puerperal (or postnatal) psychosis affects between 1 and 2 in 1000 women who have given birth. Puerperal psychosis can occur in women with no previous psychiatric history. The most significant risk factors for postpartum psychosis are a personal or family history of bipolar disorder, or a previous psychotic episode.

Risk factors

- Previous history
- Family history of bipolar disorder
- Previous psychotic episode

Definition

Postpartum psychosis: Psychosis often with mania and/or depressive symptoms in the immediate postnatal period, which can become very severe. The clinical onset is rapid. Symptoms usually appear in the first 48-72 hours (2-3 days) postpartum, and the majority of episodes develop within the first 2 weeks after delivery. Puerperal psychosis differs from postpartum depression in aetiology, severity, symptoms, treatment and outcome. Puerperal psychosis is the most severe form of postnatal depression. Puerperal psychosis is a psychiatric emergency. The woman should receive help as quickly as possible.

[!] Puerperal psychosis is a psychiatric emergency and a woman needs specialist care

Symptoms

- Depressed or elated mood (which can fluctuate rapidly)
- Disorganised behaviour
- Confusion
- High mood (mania)
- Delusions, hallucinations, beliefs in fantasy or illusions
- Hallucinations, visual or auditory

It can take 6-12 months or more to recover from puerperal psychosis. The most severe symptoms tend to last between 2 to 12 weeks. However, with good medical management and support, the vast majority of women will recover fully.

Management

Most women with puerperal psychosis need referral for treatment with medication from a specialist to determine appropriate medication. This is usually an antipsychotic and/or mood stabiliser. Women who need inpatient care for depression or puerperal psychosis need to be admitted to a healthcare facility which can provide specialist psychological and/or psychiatric care. Encourage women with severe psychological ill-health to breastfeed unless they are taking a medication that is unsafe to use whilst breastfeeding.

Domestic violence

Definition

Any incident or pattern of incidents of controlling, coercive, threatening behaviour, violence or abuse between those aged 16 or over who are, or have been, intimate partners or family members.

The abuse can encompass, but is not limited to:

- Psychological
- Physical
- Sexual
- Financial
- Emotional

A woman who is experiencing domestic violence may have difficulty accessing antenatal and postnatal care services. The perpetrator of the abuse may try to prevent her from attending appointments. The woman may be afraid that disclosure of the abuse to a healthcare provider will worsen her situation.

Domestic violence during pregnancy

Domestic violence during pregnancy has been found to be associated with fatal and non-fatal adverse health outcomes for the pregnant woman and her baby due to the direct trauma of violence to a pregnant woman's body, as well as the physiological effects of stress from current or past violence on fetal growth and development.

Injuries resulting from domestic violence during pregnancy may include:
- Broken bones, cuts, burns, bruises, broken teeth and persistent headaches
- Domestic violence may frequently be focused on the abdomen during pregnancy
- Abused pregnant women also report that their partners target other body parts, such as their buttocks, breasts, genitals, head and neck and extremities

Risks to the mother and her fetus

Domestic violence during pregnancy can result in a number of adverse outcomes including:
- Intrauterine growth retardation
- Preterm birth
- Increased risk of miscarriage and abortion
- Antepartum haemorrhage, abruptio placenta
- Perinatal death, intrauterine death

Screening for domestic violence

Screening for domestic violence needs to occur at various times over the course of the pregnancy as most women will not disclose violence the first time they are asked and violence may begin later in pregnancy. Women should be screened for domestic violence at the first antenatal visit, throughout their pregnancy and at each postnatal visit.

The 'HITS Domestic Violence Screening Tool' has been specifically developed as a short, efficient method of screening individuals for domestic violence (Appendix 6). HITS is an easy to use screening tool and scale that stands for 'Hurt, Insult, Threaten and Scream'. The tool includes four questions that healthcare providers can use to assess the risk of intimate partner violence. The woman can fill in the tool herself or the healthcare providers can ask the woman the questions.

Management

Women who experience domestic violence can be supported by:
- Inform the woman that the information she discloses will be kept in a confidential record and will not be included in her handheld record.
- Provide information and support tailored to the specific needs of the woman.
- Provide a more flexible series of appointments if needed.

Information and support for women

- Offer the woman information about other healthcare providers, including non-governmental organisations or charities which provide support for women who experience domestic violence.

Counselling after adverse incidents

A serious adverse incident is defined as any event or circumstance that led or could have led to serious unintended or unexpected harm, loss or damage to women and/or their newborn baby.

There are occasions in healthcare delivery when events occur that are unexpected. Such incidents are usually described as adverse or, untoward events. This may be because:

- It involves many women.
- There is a question of poor clinical or management judgement.
- A service or piece of equipment has failed.
- A woman or baby has died under unusual circumstances; or there is a possibility or perception that any of these may have occurred.
- It is serious enough to warrant regional action to improve safety or care within the broader healthcare system.
- It is of public concern.
- It requires an independent review.

Table 14.2 Examples of adverse incidents

Maternal incident	Fetal or neonatal incident	Organisational incidents
■ Maternal death ■ Shoulder dystocia ■ Blood loss >1500ml ■ Return to theatre ■ Maternal seizure: eclampsia ■ Hysterectomy/laparotomy ■ Anaesthetic complications ■ Intensive care admission ■ Venous thromboembolism ■ Pulmonary embolism ■ Third/fourth-degree tears ■ Unsuccessful forceps or ventouse ■ Uterine rupture ■ Readmission of mother	■ Stillbirth >500g ■ Neonatal death ■ Apgar score <7 at 5 minutes ■ Birth trauma ■ Fetal laceration at Caesarean section ■ Low Apgar scores ■ Need for neonatal resuscitation ■ Neonatal seizure ■ Term baby admitted to neonatal unit ■ Undiagnosed fetal anomaly	■ Unavailability of health record ■ Delay in responding to call for assistance ■ Lack of referral ■ Faulty equipment ■ Conflict over case management ■ Medication error

Adverse clinical events can have a devastating effect, not only on the mother and baby but on the healthcare providers involved in the event. Healthcare providers involved in adverse clinical incidents, whether directly or indirectly may need support. Support can take the form of someone to talk to, debriefing, help with writing statements or reflection.

Healthcare providers can support women who wish to talk about their experience, encourage them to make use of support systems available from family and friends, and consider the effect of the birth on the partner/husband. Health and wellbeing are not just physical components.

- Healthcare providers should be aware of and responsive to possible variations in individual and cultural approaches to death.
- Counselling should be offered to all women and their partners/husbands.
- Other family members, especially existing children and grandparents, should also be considered for counselling.
- Each woman's experience and reaction is subjective and individual.
- Health components include: physical, psychological, and social aspects.
- Effective communication and empathy are essential aspects of care when counselling women after a serious adverse incident.

Further reading

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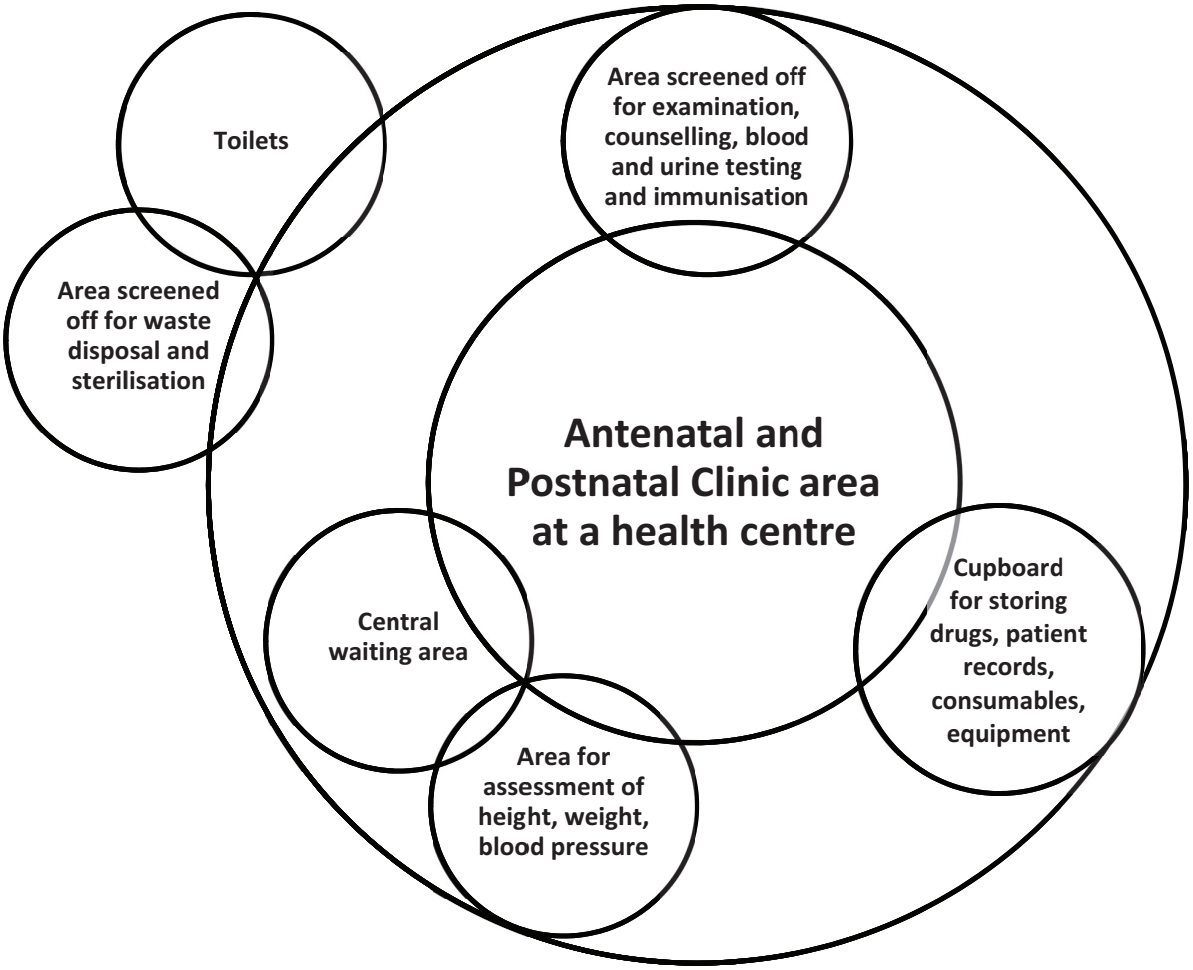
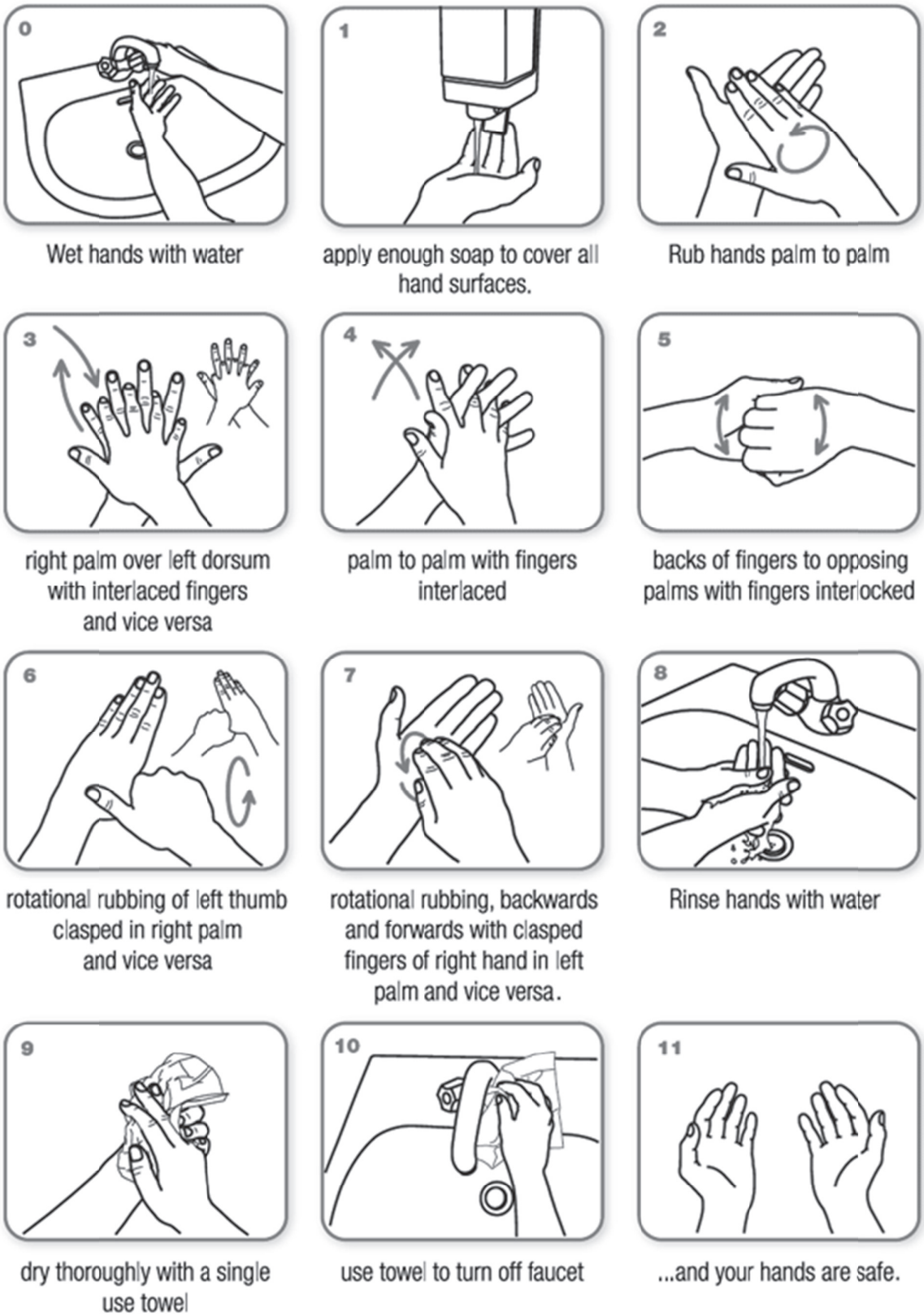
Appendices

Appendix 1: Suggested layout for an antenatal and postnatal clinic

A suggested layout for an antenatal and postnatal clinic at either a small health centre or a larger hospital when no separate rooms are available:



Appendix 2: Handwashing technique



Appendix 3: Use of obstetric ultrasound during and after pregnancy

1st Trimester	2nd Trimester	3rd Trimester	Intrapartum	Postnatal
■ Pregnancy dating/gestational age assessment which is most accurate between 10+0 and 13+6 weeks. ■ Pregnancy localisation in cases of suspected ectopic pregnancy. ■ Assessment of early pregnancy bleeding to confirm viability before management of suspected miscarriage. ■ Chorionicity and placentation in multiple pregnancy. ■ Nuchal Translucency measurement as part of downs syndrome screening.	■ Fetal anomaly scan at between 18 and 22 weeks. ■ Cervical length assessment in suspected cervical insufficiency. ■ Uterine artery flows in women at high risk of preeclampsia and intrauterine growth restriction. ■ Placenta localisation for placenta praevia and accreta. ■ Intrauterine fetal death confirmation.	■ Fetal growth and wellbeing in suspected small-for- gestational age, intrauterine growth restriction and previous stillbirth. ■ Assessment of large for gestational age babies. ■ Assessment of fluid volume for oligohydramnios and polyhydramnios. ■ Presentation to rule out abnormal lies such as breech, transverse and unstable lies. ■ External cephalic version as an aid to diagnosis and the procedure. ■ Intrauterine fetal death confirmation.	■ To confirm presentation in labour e.g. suspected breech. ■ Twin delivery to aid in fetal localisation. ■ Localisation of fetal heartbeat especially in high body mass index. ■ Intrauterine fetal death confirmation.	■ Late postpartum bleeding to rule out retained placental tissue (commonest cause is endometritis).

Appendix 4: Whooley questions for depression screening

1. During the past month, have you often been bothered by feeling down, depressed or hopeless?	☐ Yes	☐ No
2. During the past month, have you often been bothered by little interest or pleasure in doing things?	☐ Yes	☐ No
A third question should be considered if the woman answers 'yes' to either of the initial questions, 3. Is this something you feel you need or want help with?		

'Yes' to one (or both) questions = positive test (requires further evaluation)
'No' to both questions = negative test (not depressed)

- A positive test identifies women who may benefit from further evaluation.
- A negative test essentially rules out depression.
- The Whooley questions cannot be used to diagnose or measure the severity of depression.
- Clinical judgement should always be used when assessing depression.

Appendix 5: Edinburgh postnatal depression scale

Postpartum depression is very common. The Edinburgh Postnatal Depression Scale is a 10-question self-rating scale has been proven to be an efficient and effective way of identifying women at risk for depression related to pregnancy.

Please select the answer that comes closest to how you have felt in the past 7 days:

1. I have been able to laugh and see the funny side of things.
   - ☐ As much as I always could
   - ☐ Not quite so much now
   - ☐ Definitely not so much now
   - ☐ Not at all

2. I have looked forward with enjoyment to things.
   - ☐ As much as I ever did
   - ☐ Rather less than I used to
   - ☐ Definitely less than I used to
   - ☐ Hardly at all

3. I have blamed myself unnecessarily when things went wrong *
   - ☐ Yes, most of the time
   - ☐ Yes, some of the time
   - ☐ Not very often
   - ☐ No, never

4. I have been anxious or worried for no good reason.
   - ☐ No, not at all
   - ☐ Hardly ever
   - ☐ Yes, sometimes
   - ☐ Yes, very often

5. I have felt scared or panicky for no very good reason *
   - ☐ Yes, quite a lot
   - ☐ Yes, sometimes
   - ☐ No, not much
   - ☐ No, not at all

6. Things have been getting on top of me *
   - ☐ Yes, most of the time I have not been able to cope at all
   - ☐ Yes, sometimes I haven’t been coping as well as usual
   - ☐ No, most of the time I have coped quite well
   - ☐ No, I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping *
   - Yes, most of the time
   - Yes, sometimes
   - Not very often
   - No, not at all

8. I have felt sad or miserable *
   - Yes, most of the time
   - Yes, sometimes
   - Not very often
   - No, not at all

9. I have been so unhappy that I have been crying *
   - Yes, most of the time
   - Yes, quite often
   - Only occasionally
   - No, never

10. The thought of harming myself has occurred to me *
    - Yes, quite often
    - Sometimes
    - Hardly ever
    - Never

The Edinburgh Postnatal Depression Scale

Scoring
Questions 1, 2, & 4 (without an *) Are scored 0, 1, 2 or 3 with top box scored as 0 and the bottom box scored as 3.

Questions 3, 5¬10 (marked with an *) Are reverse scored, with the top box scored as a 3 and the bottom box scored as 0.

Range of scores
Scores

0-9: Scores in this range may indicate the presence of some symptoms of distress that may be short-lived and are less likely to interfere with day to day ability to function at home or at work. However, if these symptoms have persisted more than a week or two further enquiry is warranted.

10-12: Scores within this range indicate presence of symptoms of distress that may be discomforting. Repeat the EDS in 2 weeks' time and continue monitoring progress regularly. If the scores increase to above 12 assess further and consider referral as needed.

13+: Scores above 12 require further assessment and appropriate management as the likelihood of depression is high. Referral to a psychiatrist/psychologist may be necessary.

Item 10: Any woman who scores 1, 2 or 3 on item 10 requires further evaluation before leaving the health facility to ensure her own safety and that of her baby.

Appendix 6: Domestic violence screening tool

Hurt, Insulted, Threatened with Harm and Screamed (HITS) domestic violence screening tool

Please read each of the following activities and place a check mark in the box that best indicates the frequency with which your partner/husband acts in the way depicted.

Date: _____
Age: _____

How often does your partner/husband?	Never	Rarely	Sometimes	Fairly often	Frequently
1. Physically **H**urt you					
2. **I**nsult or talk down to you					
3. **T**hreaten you with harm					
4. **S**cream or curse at you					
	1	2	3	4	5
Total Score:					

- Each item is scored from 1-5.
- Score range is between 4-20.
- A score greater than 10 signifies that a woman is at risk of domestic violence, and should seek counselling or help from a healthcare provider or a domestic violence resource centre.

Appendix 7: Essential drugs for antenatal and postnatal care[5]

Drug	Dosage	Notes
1. Antibiotics		
Amoxicillin	500mg capsules	8 hourly 7 days' treatment = 21 capsules of 500mg/full course
Ampicillin	500mg powder (ampoules) for reconstitution for IV use	Estimate average regimen at: IV dose 1g start then 500mg 6 hourly for 5 days (can move to oral) = 22 doses of 500mg Neonatal dose: 25mg/kg ampicillin or penicillin and gentamycin (age up to 2 weeks: 3mg/kg 12 hourly; age 2 weeks to 12 years: 2mg/kg 8 hourly)
Azithromycin	250mg capsule	1g as a single dose
Benzylpenicillin (penicillin G)	1-g vial of powder for IM or IV use	Benzathine benzylpenicillin powder for injection 1.44g benzylpenicillin (=2.4 million units) in 5ml vial. Often given stat 2.4 million units IM
Cefixime	200mg capsule	400mg/day in 2 divided doses 12 hourly
Cephalosporin (e.g. cefazolin, cefotaxime, ceftriaxone)	Dosage will be 500mg either IV or oral	Estimate average IV regimen at 500mg 8 hourly for 5 days (can then move to oral) = 15 doses/case Estimate similar amount for oral use: 750 doses 500mg cephalosporin for oral use (capsules)
Clindamycin	Tablet 200mg	Two tablet twice daily for 3 days to be taken in combination with oral quinine for the treatment of uncomplicated malaria in the first trimester of pregnancy
Erythromycin	500mg capsules for oral use	Common regimen: 500mg 6 hourly for 7 days = 28 capsules/case
Gentamicin (aminoglycoside)	IV 2ml vial	Common regimen is 80mg 12 hourly IV for 7 days = 14 doses of 80mg/case
Nitrofurantoin	50mg capsule	Use as 100mg 12 hourly for 7 days. Use antenatally for treatment of urinary tract infections

[5] Please note that this table provides information on dosage for commonly used drugs. National guidelines will be followed where available.

2. Antiretrovirals		
Nevirapine	Mother: tablets 200mg Newborn: oral suspension 50mg/5ml	Single 200mg oral tablet at time of labour for mother and for newborn 2mg/kg as single dose in first 72hours (average baby 3.5kg = 7mg = <1ml/case)
Efavirenz + emtricitabine + tenofovir 30mg	Tablet 600mg + 200mg + 300mg	Co-formulated tablets in blister packs. 1 tablet once daily
Lamivudine + nevirapine + zidovudine (AZT)	Tablet 150mg + 200mg + 300mg	Co-formulated tablets in blister packs. 1 tablet twice daily
Lamivudine + nevirapine + stavudine Tablet	Tablet 150mg + 200mg + 30mg	Co-formulated tablets in blister packs. 1 tablet twice daily
Lamivudine + stavudine	Tablet 300mg + 300mg	Co-formulated tablets in blister packs
Lamivudine + zidovudine	Tablet 150mg + 300mg	Co-formulated tablets in blister packs. 1 tablet twice daily
Tenofovir tablet	300mg	1 tablet once daily (used in conjunction with other antiretroviral medicines)
3. Anti-TB		
Isoniazid	Tablet, 100mg	5mg/kg once daily – maximum dose: 300mg/day
Pyrazinamide	Tablet, 400mg	25mg/kg once daily – maximum dose: 2g/day
Rifampicin Tablet	Tablet, 150mg and 300mg	600mg monthly on an empty stomach
Ethambutol	Tablet 100mg and 400mg	15mg/kg once daily – maximum dose: 120mg/day
Kanamycin	1g in vial	Complementary list medicine for treatment of MDR TB
Ofloxacin	Tablet 200mg and 400mg	Complementary list medicine for treatment of MDR TB
4. Respiratory drugs		
Prednisolone	Tablet 5mg	Initial dose: 20-70mg/day Maintenance dose: 5-15mg/day. Single daily dose in the morning with food
Terbutaline inhaler, 100mg	100mcg/metered dose	One inhalation as required. Not more than 4 inhalations should be required in any 24-hour period The duration of action of a single dose is up to 6 hours
Salbutamol Inhaler	100mcg/metered dose per puff	2 to 4 inhalations every 10-30 minutes in symptomatic treatment of asthma attack
Hydrocortisone	Tablet 10mg	60-80mg every 4-6 hours for 24 hours then gradually reduce the dose over several days
Salbutamol Nebulizer	2.5mg, 5mg – solution for inhalation	5mg in 2.5ml to be administered via a nebuliser in severe asthma attack

5. Antiemetics		
Metoclopramide	Tablet 10mg or injection, 5mg/ml in 2ml	15mg-30mg/day in 3 divided doses 6 hourly
Ondansetron	Tablet, 4mg	4mg or 8mg BD
Promethazine	Tablet, 25mg	25-75mg/day in 3 divided doses or once at night
Prochlorperazine	5 to 10mg tablet or IV/IM	Prevention: 5-10mg two or three times a day Treatment: 20mg immediately
Cyclizine	50mg tablet or injection	50mg orally, which may be repeated up to three times a day or 50mg IM or IV up to three times daily
6. Antimalarials		
Quinine	Tablets of 300mg IV Quinine dihydrochloride 300mg/ml = 2ml ampoule	Oral – 600mg 8 hourly for up to 10 days IV – 20mg/kg initially (estimate 1200mg) then 10mg/kg 8 hourly (estimate 600mg) for 48 hours then usually switch to oral
Sulfadoxine pyrimethamine	Tablets of 500mg + 25mg	2 or 3 presumptive treatment doses given during antenatal period where chloroquine resistance is noted or as the preferred national regimen
Artesunate-amodiaquine	Tablets 100mg + 270mg	Co-formulated tablets in blister packs. 2 tablets once daily for 3 days
Artemether Lumetantrine	Tablets 20mg + 120mg	Co-formulated tablets in blister packs. The treatment is administered twice daily for 3 days
7. Antacids		
Magnesium Trisilicate	Tablet, 500mg	1 or 2 tablets to be chewed four times a day
Omeprazole	Capsule, 10mg and 20mg	20mg once a day in the morning for 3 days
Ranitidine	Tablet, 150mg or Injection, 25mg/ml in 2ml	150 BD, or 300mg at bedtime
8. Thyroid medication		
Carbimazole	Tablet 40mg	20-60mg, taken as two to three divided doses. The dose should be titrated against thyroid function
Propylthiouracil	Tablet 50mg	50-150mg once a day
Levothyroxine	Tablet 100mg	100-200mg once a day

9. Antiepileptics		
Lamotrigine	Tablet 100mg	100mg or 400mg each day depending upon severity
Levetiracetam	Tablet 500mg	1,000mg and 3,000mg each day depending on severity
Primidone	100-125mg titrated oral doses	One tablet twice daily
Topiramate	Tablet 200mg	200-400mg in two divided doses
Carbamazepine	Tablet 100mg and 200mg	0.8-1.2g daily in divided doses
10. Antihypertensives		
Labetalol	Labetalol tablets for oral use 100mg Labetalol for injection 5mg/ml 20ml ampoules	Oral 100-200mg 12 hourly tablets 10-20mg IV if hydralazine not available or not effective Maintenance dose 40mg/hour IV for 24 hours
Nifedipine	Sustained-release tablets 5mg or 10mg	5-10mg given orally in pre-eclampsia, may need to repeat Then 20-100mg daily in two divided doses; assume for 30 days maximum
Methyldopa	250mg tablets	Dose 2-3 tablets daily, on average, up to a maximum of 4g/day
11. Anti-diabetic drugs		
Insulin Injection,	40iu/ml in 10ml vial in 10ml or 100iu/ml in 10ml vial	SC/IM/IV according to individual requirements
Metformin	Tablet, 500mg	500mg 3 times a day with food or 850mg BD with or after food
12. Anti-anaemia drugs		
Folic acid	Tablet 1mg or 5mg	Dosage is 1 tablet/day each of ferrous sulphate and folic acid unless in one combined tablet
Ferrous sulphate	Tablet 200mg	Ferrous sulphate minimum need 60mg/day with 450 micrograms folic acid. Ferrous sulphate 200mg tablets contain 65mg elemental iron
13. Antifungals		
Nystatin	Tablets 100,000 units Pessaries 100,000 units	Oral candidosis: 4 times daily for 1 month Vaginal candidosis: 1 pessary at night for up to 2 weeks
Clotrimazole	Pessary	
Fluconazole	Tablet 50mg, 100mg and 200mg	50-200mg once daily for 7-14 days

14. Antidepressants		
Citalopram	Tablet 20mg	20mg once day
Fluxoetine	Tablet 20mg	20mg once day
Sertraline	Tablet 50mg	50mg once a day
15. Antipsychotics		
Haloperidol	Tablet 5mg, 2mg/ml oral solution	2-10mg/day in 2 divided doses. Dose may be gradually increased to 20mg/day if necessary
Olanzapine	Tablet 10-20mg	15mg once a day
Risperidone	Tablet 1mg	2mg in 2 divided doses. May be increased to 6mg/day in 2 divided doses if needed
Clozapine	Tablet 12.5mg	
16. Obstetric emergencies		
Magnesium sulphate	4g magnesium sulphate IV (slowly, over 5-10 minutes)	For seizure (fit) in eclampsia: Initially: 4g magnesium sulphate IV (slowly, over 5-10 minutes) Followed by: 1g/hour for minimum of 24 hours, using syringe driver. If syringe driver pump not available, follow-up dose also given as 5g IM every 4 hours for at least 24 hours after last seizure
Calcium Gluconate	1g IV	1g Iv slowly followed by 4g daily by continuous infusion
Diazepam	Tablet, 5mg 5mg/ml in 2ml ampoule	10mg IV slowly, if necessary repeat. Diazepam may also be useful in cases of neonatal convulsions
Hydralazine	Powder for reconstitution for injection 20mg ampoules, IV or IM	Stat dose 5-10mg IV repeat if necessary (maximum 20mg) Maintenance dose:
17. Anticoagulants		
Heparin (Low molecular weight)	Injection, 1000iu/ml or 5000iu/ml	Prophylaxis: 5000 IU every 12 hours Treatment: SC 15,000 IU 12 hourly. Daily lab monitoring is essential and dose adjusted accordingly
Warfarin	Tablets 1,2 and 3mg	Baseline prothrombin time (INR) should be determined before initial dose and checked regularly. Usual dose 3-9mg daily

18. Analgesics		
Paracetamol	Tablets 500mg	1g 4-6 hourly, no more than 4g in a 24hr period. Use as analgesic antenatally and postnatally and with fever, e.g. in sepsis, malaria
Ibuprofen	Tablets 200mg	1.2-1.8g daily in 3-4 divided doses
Pethidine	50mg/ml 1-ml ampoules for injection	50-100mg IM injection 3 hourly up to 400mg/24 hours
Morphine	10mg IM/IV	IM/IV 10-20mg given 4-6 hourly up to 150mg/24 hours
19. Corticosteroids		
Dexamethasone, Betamethasone	Dexamethasone and betamethasone 1ml ampoules of 4mg/1ml for injection	Betamethasone 12mg IM 2 doses 24 hours apart OR Dexamethasone 6mg IM 4 doses 12 hours apart. A single course of antenatal corticosteroids should be considered routine for preterm delivery If gestational age less than 34 weeks
20. Other drugs		
Vitamin A	Tablets 200,000 units	In antenatal period, up to 10,000 units can be given daily in areas with vitamin A deficiency. Postnatal recommendation of 200,000 units once in some countries
Aciclovir	Tablet 200mg	400mg 3 times per day for 7 days
Mebendazole	Tablet 500mg	Once off dose during pregnancy. Dose also given as 100mg twice daily for 3 days. Not routinely recommended
21. Neonatal drugs		
Vitamin K	Phytomenadione (vitamin K1) (Konakion® MM paediatric, Roche) 10mg/ml in 0.2ml ampoules	0.1ml IM at or shortly after birth. 1mg may be given by IM and this prevents vitamin K deficiency bleeding in virtually all babies
Tetracycline	Tetracycline hydrochloride 1% eye ointment	At birth, 1 application of ointment to each eye. Generic amount

Appendix 8: List of reviewers

The content of this manual has been reviewed by many people from different disciplines and countries.

The content was first reviewed as part of a multi-country workshop with 46 participants from ten countries. In addition, colleagues from Ghana, Togo and Afghanistan have provided invaluable inputs, feedback and amendments during in-country demonstration workshops.

Our sincere thanks to all!

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