Federal Democratic Republic of Ethiopia
Ministry of Health

Labour and Delivery Care

Blended Learning Module for the Health Extension Programme

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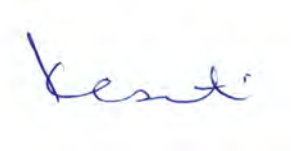
The Ethiopian Federal Ministry of Health (FMOH) and the Regional Health Bureaus (RHBs) have developed this innovative Blended Learning Programme in partnership with the HEAT Team from The Open University UK and a range of medical experts and health science specialists within Ethiopia. Together, we are producing 13 Modules to upgrade the theoretical knowledge of the country's 33,000 rural Health Extension Workers to that of Health Extension Practitioners, and to train new entrants to the service. Every student learning from these Modules is supported by a Tutor and a series of Practical Training Mentors who deliver the parallel Practical Skills Training Programme. This blended approach to workplace learning ensures that students achieve all the required theoretical and practical competencies while they continue to provide health services for their communities.

These Blended Learning Modules cover the full range of health promotion, disease prevention, basic management and essential treatment protocols to improve and protect the health of rural communities in Ethiopia. A strong focus is on enabling Ethiopia to meet the Millennium Development Goals to reduce maternal mortality by three-quarters and under-5 child mortality by two-thirds by the year 2015. The Modules cover antenatal care, labour and delivery, postnatal care, the integrated management of newborn and childhood illness, communicable diseases (including HIV/AIDS, malaria, TB, leprosy and other common infectious diseases), family planning, adolescent and youth reproductive health, nutrition and food safety, hygiene and environmental health, non-communicable diseases, health education and community mobilisation, and health planning and professional ethics.

In time, all the Modules will be accessible from the Ethiopian Federal Ministry of Health website at **www.moh.gov.et**; online versions will also be available to download from the HEAT (Health Education and Training) website at **www.open.ac.uk/africa/heat** as open educational resources, free to other countries across Africa and anywhere in the world to download and adapt for their own training programmes.



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Ethiopian Federal Ministry of Health

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Contents

Introduction to the *Labour and Delivery Care* Module

The World Health Organization (WHO) states that every year more than 133 million babies are born globally, of which 90% are in low- and middle-income countries. Every year, almost 8 million children die before their fifth birthday, but the great majority of these deaths occur in the perinatal period (i.e. around the time of birth). Global perinatal mortality is estimated to be about 7 million deaths every year (3.5 million stillbirths and 3.5 million deaths in the first 7 days). This death toll is more than the combined annual deaths globally due to HIV/AIDS (2.1 million), tuberculosis (1.6 million) and malaria (1.3 million), which together add up to 5 million lives lost. Almost one quarter of the 7 million perinatal deaths occur during labour and delivery. The causes of perinatal and maternal deaths in developing countries are almost similar (haemorrhage, hypertensive disorders of pregnancy, eclampsia, infection and obstructed labour).

The lives of many women in labour and delivery and their babies could be saved in less developed countries if births were attended by well-trained health professionals. Globally, the proportion of births attended by a skilled birth attendant in less developed countries increased from about 50% in 1990 to 60% in 2006. The global targets set at a special session of the United Nations General Assembly in 1999 were 80% by 2005, 85% by 2010 and 90% by 2015. This shows that the achievement was far below the target and there is a great need for further endeavour. To be specific, regions with the lowest proportions of skilled-birth-attended deliveries were eastern Africa (34%), western Africa (41%) and south-central Asia (47%). It is also in these regions where the highest numbers of maternal and perinatal deaths occur.

In Ethiopia there is some progress in antenatal care coverage, but the labour and delivery service may be the lowest in the world: more than 94% of pregnant women labour and deliver at home, unattended by skilled healthcare personnel. Probably that is why more than 10,000 Ethiopian women are suffering at home from one of the morbid complications of obstructed labour (*fistula*, an opening between the birth canal and other internal organs), and the maternity wing of almost all public hospitals outside Addis Ababa are filled by women with complications due to obstructed labour. An estimated 22,000 women die in Ethiopia every year from a cause associated with their pregnancy or childbirth.

Many of the common causes of maternal and perinatal mortality, including obstructed labour, eclampsia and postpartum haemorrhage, are of an unpredictable nature. Therefore it is the presence of skilled personnel intervening during an emergency in labour and delivery that brings significant change in maternal and child health outcomes. Taking this into account, the current recommendation is that every labouring mother should be attended by a skilled person either at a health facility or at home. The aim is to conduct a normal delivery for the majority, and early detection and referral for those women and babies who develop complications.

This *Labour and Delivery Care* Module is formulated to equip you with the basic principles and practice of skilled birth attendance at Health Post and home level. It has 11 study sessions. You will first learn in detail how to identify true labour, the different stages of labour, the preparations and skills for conducting a normal delivery and supporting the mother through the four stages, and techniques for monitoring the progress of labour using a chart called the partograph. The second half of the Module introduces you to the basic techniques of newborn resuscitation, identifying and managing malpresentations and twin births during labour, and the diagnosis and emergency interventions in obstructed labour, uterine rupture and postpartum haemorrhage. All of the principles and techniques taught in this Module will be reinforced and expanded in your practical skills training. Blending the theory and practice of labour and delivery care will enable you to support the health and the survival of labouring women and newborns in your community.

Study Session 1 Recognition of Normal Labour

Introduction

Ideally the same health professional will look after the pregnant woman and her baby from the first antenatal visit until the end of the postnatal period. This is known as the **continuum of care**. You have already studied the Module on *Antenatal Care*. Now you are moving on to learn about *Labour and Delivery Care*. **Labour** is the term for the changes in anatomy and physiology in the female reproductive tract that prepare the fetus and the placenta for delivery. In the majority of cases, this happens when the baby is fully developed at full term, between 37–40 weeks gestation. Labour heralds the end of the baby's time in the uterus and the beginning of adaptation to life outside the mother.

This first study session serves as an introduction to the *Labour and Delivery Care* Module. The emphasis is on helping you make the diagnosis of true labour and distinguishing it from false labour, and recognising the signs of the four stages of labour. This session will help you to understand the labour and delivery process, so that you can make accurate decisions and feel confident when you attend births. You will also learn how to prepare the pregnant woman to become aware of the changes in her body that indicate labour will start soon, and how to recognise the onset of true labour, so she can send for you to come in good time.

Learning Outcomes for Study Session 1

When you have studied this session, you should be able to:

1.1 Define and use correctly all of the key terms printed in **bold**. (SAQ 1.1, 1.2, 1.3 and 1.4)

1.2 Describe the signs of true labour and distinguish between true and false labour. (SAQs 1.2 and 1.3)

1.3 Explain to the mother how to recognise the onset of true labour. (SAQ 1.2)

1.4 Describe the characteristic features and mechanisms of the four stages of labour. (SAQ 1.4)

1.5 Describe the seven cardinal movements made by the baby as it descends the birth canal in a normal labour. (SAQ 1.4)

1.1 The indefinite nature of labour

You need to be aware that labour may start at any time. This is one of its 'indefinite' features, so you should always be ready to take appropriate action. Despite much advancement of maternal and fetal health sciences, so far nobody knows exactly:

- When is labour going to start?

That is why even the normal onset of labour is anticipated in a wide range of weeks (at Health Post level 37–40 weeks is considered the normal 'window'; at hospital level, it can be at 37–42 weeks with close follow up using ultrasound scanning). Although it is good to calculate the **expected date of delivery** as 40 weeks from the mother's last normal menstrual period

(LNMP), if she knows the date (many mothers do not), tell her that she is probably *not* going to deliver on the expected date. Only about 2% of deliveries occur on the expected date even among women who know their LNMP date exactly. The other major indefinite features of labour are:

- What initiates/stimulates labour to begin? Is it factors in the fetus, the mother or both?
- Why do some women develop preterm labour?
- Why do unpredicted labour abnormalities occur?

We have to leave these questions unanswered, and focus on the normal labour occurring at term.

1.1.1 Normal labour

A **normal labour** has the following characteristics:

- Spontaneous onset (it begins on its own, without medical intervention)
- Rhythmic and regular uterine contractions
- Vertex presentation (the 'crown' of the baby's head is presented to the opening cervix, as you learned in Study Session 6 of the *Antenatal Care* Module)
- Vaginal delivery occurs without active intervention in less than 12 hours for a multigravida mother and less than 18 hours for a primigravida (first birth)
- No maternal or fetal complications.

Any type of labour that deviates from these conditions is considered abnormal, and usually requires referral for specialist care. You will learn how to deal with different types of abnormal labour later in this Module in Study Sessions 8–11. Next, we describe the signs that tell you and the mother that true labour has begun.

1.2 How do you know that true labour has begun?

True labour is characterized by regular, rhythmic and strong uterine contractions that will increase progressively and cannot be abolished by anti-pain medication. Pain symptoms may be relieved a little if the woman takes painkilling drugs, but true labour will still progress.

1.2.1 What is adequate uterine contraction?

If true labour is progressing, there will be **adequate uterine contraction**, evaluated on the basis of three features — the frequency, the duration and the intensity of the contractions:

- The **frequency** of uterine contractions will be 3–5 times in every 10 minute period.
- Each contraction lasts 40–60 seconds; this is known as the **duration** of contractions.
- The woman tells you that her contractions feel strong; this is the **intensity** of contractions.

You can assess the strength of uterine contractions for yourself by palpating the woman's abdomen in the area of the fundus (top) of the uterus. In between

contractions, when the uterus is relaxed and the muscular wall is soft, you will be able to palpate the fetal parts. But when a strong contraction comes, you will not be able to feel the fetal parts, because the abdominal wall over the uterus is very tense and very painful if you apply deep pressure with your fingers.

In Study Session 4, you will learn how to record the frequency, duration and intensity of contractions on a chart called the *partograph.*

1.2.2 Show and leakage of amniotic fluid

During most of the pregnancy, the tiny opening in the cervix is plugged with mucus. In the last few days of pregnancy, the cervix may begin to open. Sometimes the mucus and a little bit of blood drip out of the vagina. This is called **show**. It may come out all at once, like a plug, or it may leak slowly for several days. When you see the show, you know that the cervix is softening, thinning and beginning to efface (open). Be careful not to confuse the show with the normal discharge (wetness from the vagina) that many women have in the two weeks before labour begins. That discharge is mostly clear mucus and is not coloured a little bit red with blood.

True labour may be spontaneously established *with or without* show and *with or without* leakage of **amniotic fluid** (the waters in the fetal membranes surrounding the baby). In many parts of Ethiopia, people think that labour is not progressing if they *don't* see leakage of amniotic fluid either before or after labour begins. This is not true. You should be clear that show and leakage of amniotic fluid are *not* required for labour to begin or progress.

If labour has not started or not progressed much within 6 hours after the waters break, refer the woman to a higher health facility as soon as possible.

When the bag of waters breaks (fetal membranes rupture), there can be a big gush of amniotic fluid from the vagina, or a slow leak. In most women, the bag of waters normally breaks during early labour. If the fetal membranes rupture *before* labour begins, there should only be a few hours delay before labour starts. If labour does not start within 6 hours after the bag of waters breaks, there is a risk of infection entering the uterus, which gets stronger the more time that goes by after the membranes rupture. You learned about premature rupture of membranes (or PROM) in Study Session 17 of the *Antenatal Care* Module. Remember that 'premature' refers to the fetal membranes rupturing 'early' (before labour starts) – not to the gestational age of the baby, which may be preterm, term or post-term when the waters break.

However, even if the fetal membranes break *after* labour begins, as is normally the case, there are some risks associated with the leakage of amniotic fluid that you should be aware of.

■ Think back to what you already learned about PROM. Can you suggest what risks might occur if the waters break while the woman is *already* in labour?

□ Potential complications of rupture of fetal membranes *during* labour are:

- Infection: Since the 'door' to the uterus is open and you are going to do pelvic examinations with your gloved fingers to assess the progress of labour, there is a risk of transferring infection into the uterus unless you are very careful about hygiene (as you will learn in later study sessions of this Module). This risk gets bigger if the labour is prolonged.
- The umbilical cord may **prolapse** (be pushed out ahead of the baby as the waters gush out through the cervix), or the cord may become trapped against the endometrial wall by the baby which is no longer

kept 'floating' by the amniotic fluid. If the cord is compressed, the baby can develop hypoxia (low oxygen levels) because the blood flow is restricted in the cord, and it may die or be brain damaged.

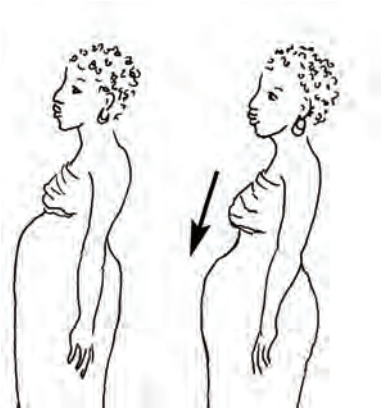
1.2.3 Distinguishing true labour from false labour

There is a condition termed **false labour**, which may be felt one or two weeks ahead of true labour. It is characterised by irregular contractions which are less painful than in true labour and they don't progress. Table 1.1 contrasts the characteristics of true and false labour. When a woman has a false labour, she should not be discouraged. Tell her that although she is not yet in true labour, the signs she is experiencing mean that her labour will start soon. Advise her on the signs of **true labour** (Table 1.1 and the next section) and tell her to call you or to come to the Health Post when the signs of true labour appear.

Table 1.1 Characteristics of true and false labour

Characteristics	True labour	False labour
Uterine contractions	Contractions occur at regular intervals, but the interval between each contraction gradually becomes shorter	Contractions occur at irregular intervals
	Duration of each contraction gradually increases	Duration remains unchanged — either long or short
	Intensity of contractions becomes stronger and stronger	Intensity remains unchanged
Cervical dilation	Cervix progressively dilates	Cervix does not dilate, remains less than 2 cm
Pain	Discomfort at the back in the abdomen, cannot be stopped by strong anti-pain medication	Discomfort is non-specific (has no particular location) and is usually relieved by strong anti-pain medication or by walking

1.2.4 Helping the mother recognize a true labour



There is no way to be sure when a woman's labour will begin, but there are some signs that it will start soon. Babies often drop lower in the mother's belly about 2 weeks before birth, which is known as **lightening**; commonly, mothers feel that the baby is no longer lying 'high' in the abdomen, and not pushing her stomach upwards. If she has had babies before, this baby may not drop until labour begins.

Other signs may happen only a day or two before labour starts. The mother's stool may change, or a little show (bloody mucus) may come out of the vagina. Sometimes, the bag of waters leaks or breaks (premature rupture of fetal membranes — PROM) before labour begins.

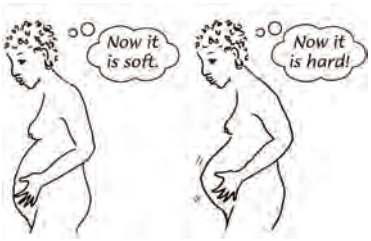
Recognizing true labour isn't an easy task for the mother, particularly if this is her first baby. She may come repeatedly to the Health Post or call for you, assuming that minor complaints are the start of true labour. Counselling the mother and her family on birth preparedness is part of focused antenatal care (as you learned in Study Session 13 of the *Antenatal Care* Module). When you counsel her on how to recognize true labour and what actions to take, make sure you use simple and easily understandable language and clearly

demonstrate what she will feel on her abdomen. Your role is very important, first to minimize the mother's anxiety about the labour, and second to reduce her unnecessary costs and time spent visiting the health facility for false labour or minor complaints.

Tell her that true labour is:

- Regularly and progressively increasing pushing-down pain, which happens about 3–5 times in every 10 minutes. (Check whether she knows or can estimate how long 10 minutes is).
- Characterized by a pushing down pain, which is usually felt first in her lower back and moving around to the front in the lower abdomen below her belly button.

Demonstrate on her abdomen:



- What will happen due to lightening
- Where she will feel the abdomen is hard during contractions
- Where she will feel the maximum pushing-down pain.

1.3 Stages of labour

In this section, you will learn some basic introductory information about the stages of labour and birth. Each stage will be discussed in more detail in subsequent study sessions in this Module. Labour is traditionally divided into four stages:

- The first stage of labour (the cervical opening stage)
- The second stage of labour (the pushing stage, ending in the birth of the baby)
- The third stage of labour (the birth of the placenta)
- The fourth stage of labour (the first 4 hours after birth).

1.3.1 First stage of labour

The **first stage of labour** is characterized by progressive opening of the cervix, which dilates enough to let the baby out of the uterus. For most of the pregnancy, nothing can get in or out of the cervix, because the tiny opening in it is plugged with mucus.

During pregnancy the cervix is long and firm, like a big toe (see Figure 1.1a), but the immediate effect of uterine contraction is to dilate the cervix and shorten the lower segment of the uterus, so the edges of the cervix are gradually drawn back and are taken up. This process is called **effacement** (Figure 1.1b and c).

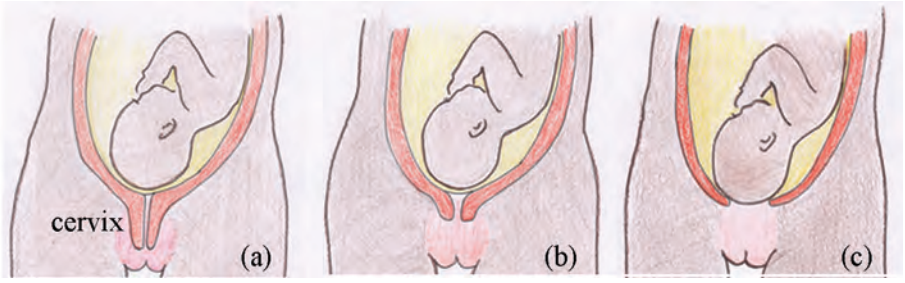


Figure 1.1 Effacement of the cervix. (a) Before labour begins, the cervix is not effaced. (b) Cervix is 60% effaced. (c) Cervix is fully effaced.

The cervix then dilates (the diameter gradually increases) – this is known as **cervical dilatation**. Each time the uterus contracts, it pulls a little bit of the cervix up and open. Between contractions, the cervix relaxes. The first stage is divided into two phases: the latent and the active phase, based on how much the cervix has dilated.

Latent phase

The **latent phase** is the period between the start of regular rhythmic contractions up to cervical dilatation of 4 cm. During this phase, contractions may or may not be very painful, and the cervix dilates very slowly. The latent phase ends when the rate at which the cervix is dilating speeds up (it dilates more quickly). This signals the start of the active phase.

Active phase

The **active phase** is said to be when the cervix is greater than 4 cm dilated. Contractions become regular, frequent and usually painful. The rate of cervical dilation becomes faster and it may increase in diameter by as much as 1.2 to 1.5 cm per hour, but the minimum dilation rate should be at least 1 cm per hour. You should start to plot data on the *partograph* at this stage, as you will learn to do in Study Session 4 of this Module.

Cervical dilatation continues until the cervix is completely open: a diameter of 10 cm is called **fully dilated**. This is wide enough for the baby to pass through (Figure 1.2). At this diameter, you would not feel the cervix over the fetal head when you make a vaginal examination with your gloved fingers. (We will describe how to do this later in this Module and you will be shown how to do it in your practical training sessions.)

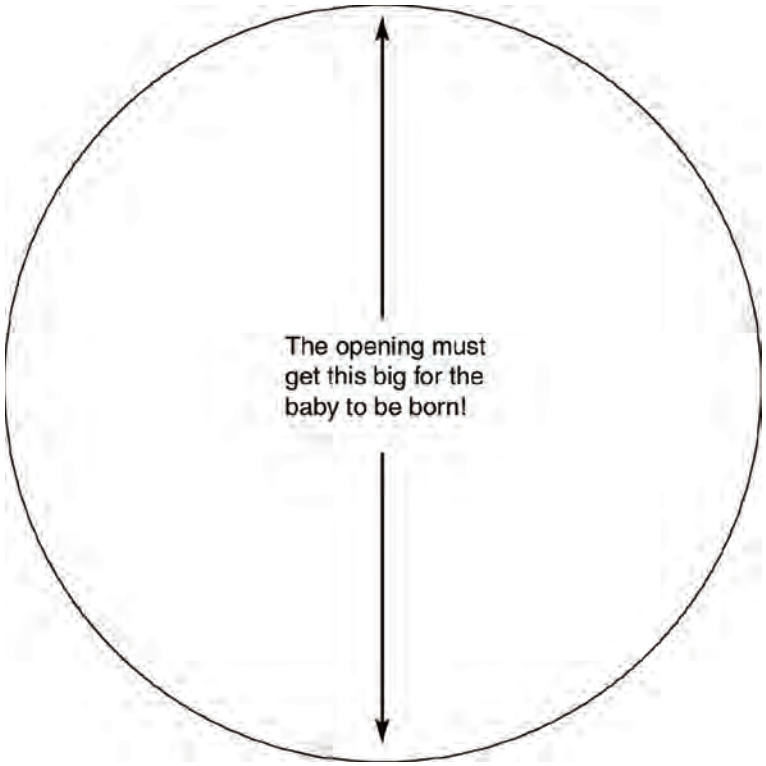


Figure 1.2 A fully dilated cervix is 10 cm in diameter.

1.3.2 Second stage of labour

The **second stage** begins when the cervix is fully dilated (10 cm) and is completed when the baby is completely born. After the cervix is fully dilated, the mother typically has the urge to push. Her efforts in 'bearing down' with the contractions of the uterus move the baby out through the cervix and down the vagina. This is known as *fetal descent*. The rate of fetal descent is an important indicator of the progress of labour, which will be described in more detail later. The average duration of second stage is 1 hour and usually not longer than 2 hours. Table 1.2 summarises the symptoms and signs during the first and second stages of normal labour.

Table 1.2 Characteristics of the first and second stages of normal labour.

Symptoms and signs	Stage	Phase
Cervix not dilated Uterine contractions not regular or strong	False labour/Not in labour	
Regular uterine contraction but not very strong Cervix dilated less than 4 cm	First	Latent
Regular and strong uterine contractions Cervix dilated 4–9 cm Rate of dilatation typically 1 cm per hour or faster Fetal descent begins	First	Active
Cervix fully dilated (10 cm) Fetal descent continues Mother has no urge to push	Second	Early (non-expulsive)
Cervix fully dilated (10 cm) Presenting part of fetus reaches pelvic floor Mother has the urge to push	Second	Late (expulsive)

The delivery of the baby marks the end of the second stage.

1.3.3 Third stage of labour

The **third stage** of labour is the delivery of the placenta and membranes after the baby has been born. The duration is usually a maximum of 30 minutes. (You will learn more about this stage in Study Session 6 of this Module.)

1.3.4 Fourth stage of labour

The first four hours immediately following placental delivery are critical, and have been designated by some experts as the **fourth stage of labour**. This is because after the delivery of the placenta, the woman can have torrential vaginal bleeding due to failure of uterine contractions to close off the torn blood vessels where the placenta detached from the uterine wall. Therefore, you should be vigilant to detect revealed or concealed postpartum haemorrhage and manage it accordingly. (You will learn about this in detail in Study Session 11 of this Module).

The placenta, membranes and umbilical cord should be examined for completeness and for abnormalities (Study Session 6 covers this). Maternal blood pressure and pulse should be recorded immediately after delivery and every 15 minutes for the first four hours. Normally, after the delivery of the placenta, the uterus will become firm due to sustained contraction, so the woman might feel strong contractions after the birth. Reassure her that these contractions are healthy, and help to stop the bleeding.

1.4 Mechanisms of normal labour

The **seven cardinal movements** are the series of positional changes made by the baby which assist its passage through the birth canal. (Cardinal means 'fundamentally important'.) The position before the movements begin is shown in Figure 1.3 (diagram 1) and the seven movements are in diagrams 2 to 8. As you read the descriptions that follow, keep looking at Figure 1.3.

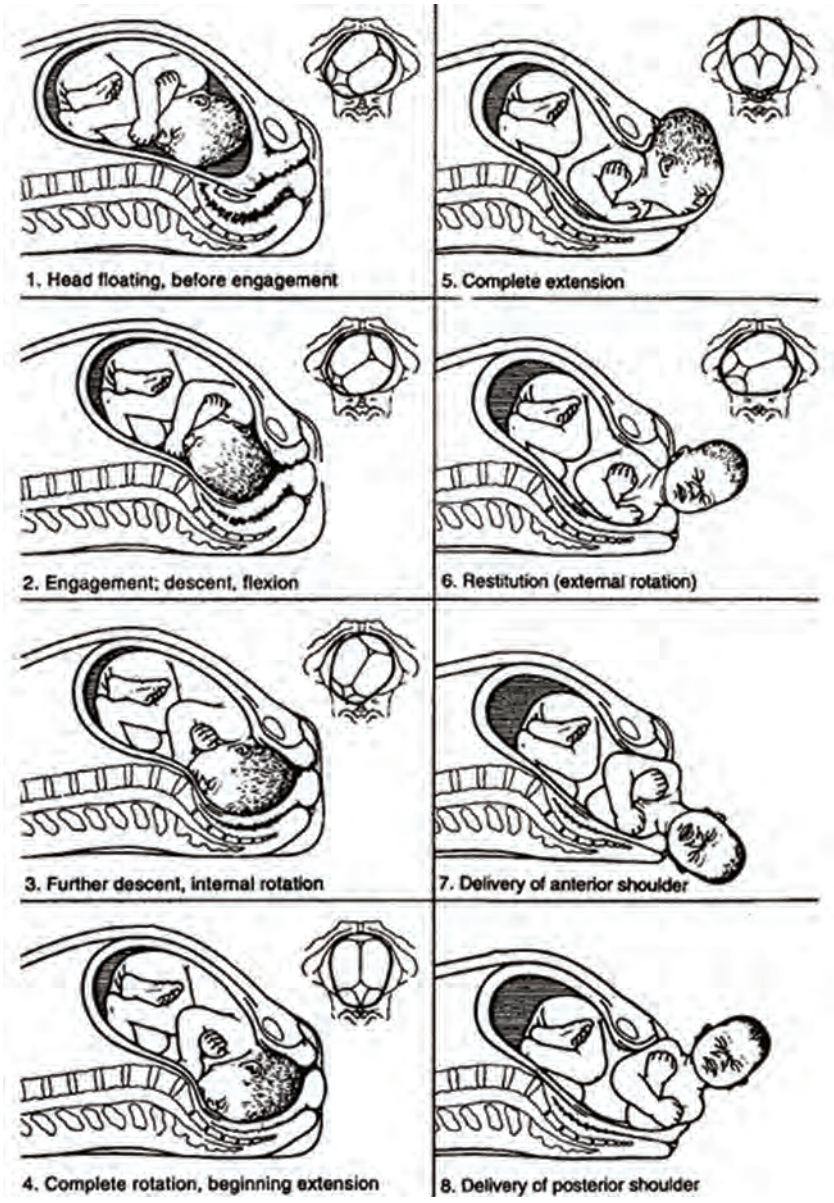


Figure 1.3 The starting position and the seven cardinal movements of the baby as it descends through the birth canal. The small pictures show the position of the baby's head, as if you were looking up the birth canal. (Source: WHO, 2008, *Midwifery Education Module: Managing Prolonged and Obstructed Labour*, 2nd edn., Figure 1.5, page 23)

The positional changes made by the baby are specific, deliberate and precise. They allow the smallest diameter of the baby to pass through the mother's pelvic cavity. Neither you nor the mother is responsible for these positional changes. The baby has the responsibility for the seven cardinal movements.

1.4.1 Engagement

Engagement is when the fetal head enters into the pelvic inlet (Figure 1.3, diagram 2). The head is said to be **engaged** when the *biparietal diameter* (measuring ear tip to ear tip across the top of the babys head, see Figure 1.4 below) descends into the pelvic inlet, and the *occiput* is at the level of the ischial spines in the mother's pelvis (see Figure 1.5).

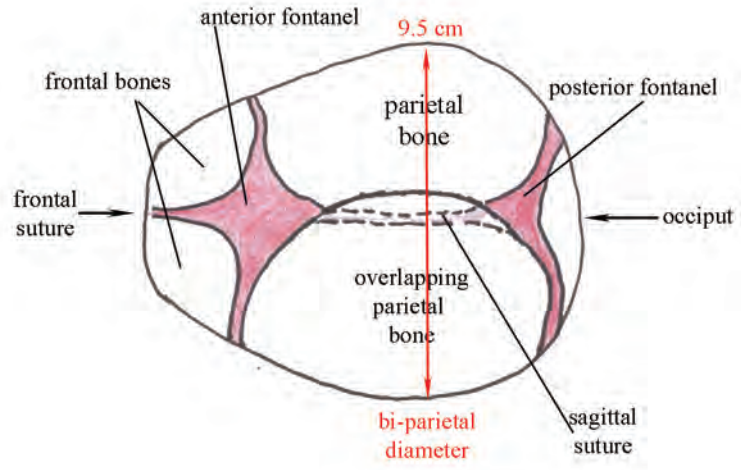


Figure 1.4 Moulding of the fetal skull may occur during descent; in this example, one parietal bone is overlapping the other at the sagittal suture. The occiput and the distance known as the bi-parietal diameter have been labelled.

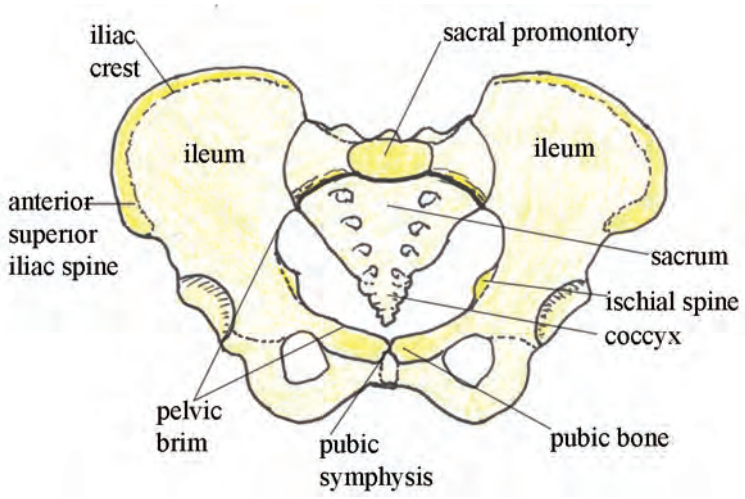


Figure 1.5 The pelvic inlet, viewed from above. Note the position of the ischial spines.

1.4.2 Descent

The term fetal **descent** is used to describe the progressive downward movement of the fetal presenting part (commonly the head) through the pelvis. When there is regular and strong uterine contraction, and the size of the babys' head and the size of the mother's pelvic cavity are in proportion so the baby can pass through, there will be continuous fetal descent deep into the

pelvic cavity. Since the pelvic cavity is enclosed with pelvic bones, when the uterus is strongly pushing down, occasionally the fetal scalp bones undergo overlapping at the suture lines in order to allow the head to pass through the narrow space. This overlapping is called **moulding**. The commonest types of moulding include one parietal bone overlapping over the other parietal bone along the sagittal suture (Figure 1.4), the occipital bone overlapping the temporal bone, and the frontal bone overlapping the parietal bones.

1.4.3 Flexion

The movement known as **flexion** occurs during descent and is brought about by the resistance felt by the baby's head against the soft tissues and bones of the mother's pelvis. The resistance brings about a flexion in the baby's head so that the chin meets the chest (Figure 1.3, diagram 2). The smallest diameter of the baby's head presents into the pelvis.

1.4.4 Internal rotation

You can see the diameters of the pelvic inlet and outlet if you look back to Figures 6.3 and 6.4 in the *Antenatal Care* Module, Part 1.

As the head reaches the pelvic floor, it typically rotates to accommodate the change in diameters of the pelvis (Figure 1.3, diagram 3). At the *pelvic inlet*, the diameter of the pelvis is widest from right to left. At the *pelvic outlet*, the diameter is widest from front to back. So the baby must rotate from lying sideways to turning its face towards the mother's backbone (Figure 1.3, diagram 4). When the rotation is complete, the back of the baby's head is against the front of the mother's pelvis). The sagittal suture in the fetal skull is no longer at an angle, but points straight down towards the mother's backbone. This movement is called **internal rotation** because it occurs while the baby is still completely inside the mother.

1.4.5 Extension

After internal rotation is complete, the baby's head passes through the pelvis and a short rest occurs when the baby's neck is under the mother's pubic arch. Then **extension** of the baby's head and neck occur – the neck extends, so the chin is no longer pressed against the baby's chest, and the top of the head, face and chin are born (Figure 1.3, diagrams 4 and 5).

1.4.6 External rotation (restitution)

After the head of the baby is born, there is a slight pause in the action of labour. During this pause, the baby must rotate so that his/her face moves from facing the mother's backbone to facing either of her inner thighs (Figure 1.3, diagram 6). This movement is called **external rotation** because part of the baby is already outside the mother (it is also called *restitution*). The rotation is necessary as the baby's shoulders must fit around and under the mother's pubic bone.

1.4.7 Expulsion

Almost immediately after external rotation, the anterior (foremost) shoulder moves out from under the pubic bone (Figure 1.3, diagram 7). The mother's perineum becomes distended by the posterior (second) shoulder, which is then also born (Figure 1.3, diagram 8). The rest of the baby's body is then born (**expulsion**), with an upward motion of the baby's body assisted by the care provider.

1.4.8 In conclusion

Note that at every stage of labour there is descent. To be specific, after the fetal head undergoes flexion, there is descent; after internal rotation, there is descent; after extension, there is descent and so on. In the next study session, we will describe the progress of a normal labour in more detail.

Summary of Study Session 1

In Study Session 1 you have learned that:

1 True labour is a natural process characterized by regular, rhythmic and strong uterine contractions that will increase progressively and produce cervical effacement and dilatation.

2 True labour can begin without a show and without the waters breaking (rupture of fetal membranes).

3 A woman in a state of false labour has uterine contraction of irregular intervals and intensity that can be relieved by anti-pain medication.

4 The woman herself can recognize true labour if you let her know that it is manifested by pushing down pains occurring 3–5 times in every 10 minutes, each contraction lasting 40–60 seconds.

5 There are four stages of labour:
   - The first stage starts with true labour and ends with full cervical dilatation (10 cm); it is divided into latent and active phases.
   - The second stage is from full cervical dilatation to delivery of the baby.
   - The third stage is from the delivery of the baby to delivery of the placenta.
   - The fourth stage is the first 4 hours after placental delivery when you need to follow the mother as closely as during labour and delivery.

6 In a normally progressing labour, the baby performs seven cardinal movements as it passes down the birth canal: engagement → descent → flexion → internal rotation → extension → external rotation/restitution → expulsion.

7 There is fetal descent during every cardinal movement.

8 Moulding of the baby's skull may occur as it passes through the mother's pelvis, under pressure from the contractions pushing it through the narrow space.

Self-Assessment Questions (SAQs) for Study Session 1

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the questions below. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 1.1 (tests Learning Outcome 1.1)

Attempt Activity 1.1 below.

Activity 1.1 Grab exercise on the key definitions

Write each of the bold terms listed below on a small piece of paper. Roll up each piece and put them in a small basket or bowl.

Pick one at a time and try to define the term. Write your answers in your Study Diary. Finally, compare your answers with the definitions in this study session. You can repeat the exercise until you are familiar with all of the words.

true labour, effacement , dilatation, presenting part, show, rupture of fetal membranes, engagement, descent, first stage, second stage, third stage, fourth stage

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SAQ 1.2 (tests Learning Outcomes 1.2 and 1.3)

Read Case Study 1.1 and then answer the questions that follow it.

Case Study 1.1 Mrs Abeba

Mrs. Abeba is 30 years of age and is having her first baby. She has come to the Health Post because she began to get regular pushing-down pains about 3 hours ago. She says that the pains start in her back and move forward to the front of her abdomen, each pain lasts about 40 seconds, and they occur 2–3 times in every 8 minutes. When you examine her, you find that her cervix is fully effaced and the diameter is 4 cm. Mrs Abeba's mother-in-law has told her she isn't in labour because she hasn't had a 'show'.

(a) What are the signs suggesting true labour from Mrs Abeba's description and the physical examination?
(b) What stage of labour has she reached and how do you know this?
(c) What will you say to Mrs Abeba to help her recognise that she is really in labour?

SAQ 1.3 (tests Learning Outcomes 1.2)

Table 1.3 summarises the difference between true and false labour. Fill in the empty boxes with appropriate descriptions.

Table 1.3 True and false labour.

True labour	False labour
Contractions occur at regular intervals	
Duration of each contraction gradually increases	
	Intensity of contractions is unchanged
cervix progressively dilates	
	Discomfort usually relieved by anti-pain medication or with walking

SAQ 1.4 (tests Learning Outcomes 1.1, 1.4 and 1.5)

Which of the following statements is *false*? In each case, explain what is incorrect.

A Lightening is when the baby floats higher in the abdomen shortly before labour begins.

B The second stage of labour ends with the expulsion of the baby from the birth canal.

C The fourth stage of labour lasts for 4 hours and begins when the placenta and fetal membranes have been expelled.

D The overlapping of fetal skull bones during the descent through the mother's pelvis is called flexion.

E The fetal head is engaged when the occiput of the fetal skull reaches the level of the ischial spines in the mother's pelvis.

F During a normal birth, both the baby's shoulders are born at the same time.

Study Session 2 Assessing the Woman in Labour

Introduction

In the first study session in this Module, you learned how to tell if true labour has begun, about the four stages of labour, and the movements the baby makes as it descends through the birth canal. In this study session, you will learn how to assess the condition of a woman who is *already* in labour, the condition of the fetus, and how it is positioned in her uterus. We also want you to pay attention to giving 'woman-friendly care' which respects her beliefs and rights.

Labour will already have begun in almost all cases when you are called to a woman's home or when she arrives at your Health Post. One of the most critical assessments you have to make in *Labour and Delivery Care* is at the time when you first attend a labour. Rapid early assessment is required so that you can decide on the care needed for the labouring mother, in case immediate referral or emergency measures are required. If all is well, you need to take the woman's history in detail and conduct a physical examination in order identify the stage of labour that she has reached, and discover any information from her history that may affect the progress or outcome of her labour. This study session builds on the assessment and history-taking skills you developed during your study of the *Antenatal Care* Module.

Learning Outcomes for Study Session 2

When you have studied this session, you should be able to:

2.1 Define and use correctly all of the key words printed in **bold**. (SAQ 2.5)

2.2 Describe how you would conduct a rapid assessment of a woman in labour. (SAQ 2.1)

2.3 Describe the features of woman — friendly care during labour and delivery. (SAQ 2.3)

2.4 Describe the steps in history taking of a woman in the first stage of a normal labour. (SAQ 2.3)

2.5 Explain how you would palpate the abdomen of a woman in labour to assess the size, lie and presentation of the baby. (SAQ 2.2)

2.6 Explain how you would conduct a vaginal examination of a woman in labour to assess the progress of labour. (SAQ 2.4)

2.7 Differentiate between normal and abnormal findings during the assessment of a woman in labour. (SAQ 2.4)

2.1 Rapid evaluation of a woman in labour

On first seeing a woman who is already in labour, your immediate task is to make a rapid assessment of whether there is any cause for concern. Does she need an urgent referral for emergency care, or is her labour progressing normally at this stage?

2.1.1 What you must do for a rapid assessment

Things you need to have

- Her Antenatal Care Card (if she has been in your care previously); if she has come to you for the first time and she is already in labour, start a new health record for her
- Partograph for recording the progress of labour
- Sterile gloves
- Fetoscope to listen to the baby's heart beat
- Thermometer to take the mother's temperature
- Watch or other timer to help you measure the fetal heart rate and the mother's pulse rate
- Blood pressure measuring cuff with stethoscope
- Swabs (3–4 balls of gauze soaked with antiseptic solution such as savlon (chlorhexidene 2–4%) to clean the perineum before doing a vaginal examination. You can prepare warm water and soap if you have no antiseptic solution.

You will learn how to use the partograph in Study Session 4.

Never use alcohol to swab the genital area!

Sometimes a woman may come to you at the Health Post already in the second stage of labour. In this case, take her to the delivery couch immediately and make her as comfortable as possible. If you are seeing her at home, select an appropriate place and make it as clean and safe as you can in the available time. It is important to prepare *in advance* the equipment you will need for attending a delivery and keep it packed and ready at all times in case you are called to a woman who is close to giving birth.

The equipment for attending a normal delivery is described in Study Session 3.

Check her vital signs

- Blood pressure: normal values range between 90/60 mmHg to below 140/90 mmHg.
- Maternal pulse rate: normal range is 80–100 beats/minute, but should not be greater than 110 beats/minute in a woman in labour.
- Temperature: average 37°C; if it is between 37.5–38.4°C the woman has a **low grade fever**; if it is 38.5°C or above, she has a **high grade fever**.

You learned how to start IV fluids in Study Session 22 of the *Antenatal Care* Module and your practical skills training.

If one or more of these vitals signs is outside of the normal range, you should refer her immediately (Figure 2.1). If the values deviate a long way outside the normal range (and you have been trained to do so), refer her after you have begun an infusion of intravenous (IV) fluids.

Figure 2.1 Don't delay in referring a woman with abnormal vital signs.

Look at and listen to the woman

- Did someone carry her into the Health Post?
- Is there blood on her clothing or on the floor beneath her (Figure 2.2)?
- Is she grunting, moaning, or bearing down?

Ask her, or someone who is with her, whether she has now or has recently had:

- Vaginal bleeding
- Severe headache/blurred vision
- Convulsions or loss of consciousness
- Difficulty breathing
- Fever

- Severe abdominal pain
- Premature leakage of amniotic fluid (waters breaking early).

If the woman *currently* has any of these symptoms, immediately:

- Shout for help
- Stay calm and focus on the woman
- Stay with her — do not leave her alone
- Take immediate action to give the necessary pre-referral treatments and refer her urgently to the nearest hospital or health centre.

Management of complicated labours is covered in detail in Study Sessions 8–11 of this Module, including referral procedures and what to do on the journey to the health facility.

Figure 2.2 If the woman is losing a lot of blood, she needs urgent help.

2.2 History-taking in labour

The best way to learn about a woman's history is to ask her, but you must do this sensitively. At first, she may not be comfortable talking with you. If she feels shy about her body or about sex, it may be difficult for her to tell you things that you need to know about her health. Try to help her feel comfortable by listening carefully, answering her questions, keeping what she tells you private, and treating her with respect.

History-taking was covered in Study Session 8 of the *Antenatal Care* Module.

2.2.1 The importance of woman-friendly care

The principles of **woman-friendly care** are shown in Box 2.1.

Box 2.1 Woman-friendly care in labour and delivery

1 It provides a service that is acceptable to the woman, which:
   - Respects her beliefs, traditions and culture
   - Considers the emotional, psychological, and social well-being of the woman
   - Provides relevant and feasible advice.

2 It empowers the woman, and whoever she wants to be with her during the labour, so that they can become active participants in her care. Your role is then to teach them *how* to care for her and keep them all informed about *what* is happening.

3 It considers and respects the rights of the woman:
   - Her right to information about her health and that of her baby
   - Her right to be informed about the process of labour and deliver and what to expect as it progresses
   - Her right to give or withhold her permission/consent for all examinations and procedures.

4 It requires all healthcare staff to use good interpersonal skills and communicate clearly in language the woman can understand.

2.2.2 Recording socio-demographic data

If you have looked after the mother during her antenatal care check-ups, you will already know this information. If this is the first time you have seen her, record her name and her age: this is particularly important if she is a very young first-time mother, below 18 years of age, which is common in Ethiopia.

You will learn more about 'cephalopelvic disproportion' in Study Session 9 of this Module.

Also record her height if possible, or estimate it; this will help you to evaluate whether she is 'small' for the size of the baby, which may mean that she could have problems giving birth if the baby's head cannot fit through her small pelvis.

Next ask her address, religion (if she chooses to share this information with you) and occupation (if she is in employment), and record it in the appropriate space in the chart.

Write down what is her main presenting symptom (her complaint), which in this case is usually labour pain (contractions), and a bearing-down sensation if she is already in second stage of labour.

2.2.3 History of past and present pregnancy

Ask about the number of previous pregnancies and births (if any) the woman has had, and about the current pregnancy. Box 2.2 shows you how to record the number of pregnancies and/or the number of births, using the traditional terminology. **Gestational age** is the number of weeks the fetus has been in the uterus; the average number of weeks at full term is 40, calculated from the date when the woman's **last normal menstrual period** (LNMP) began.

Box 2.2 Gravidity and parity status

Gravidity is the total number of previous pregnancies, regardless of the outcome, including spontaneous miscarriage or abortion before 28 weeks of gestation.

- Gravida 1 or **primigravida**: first pregnancy
- Gravida 2: second pregnancy, etc.
- **Multigravida**: pregnant two or more times (number not specified)

Parity is the number of babies delivered either alive or dead *after* 28 weeks of gestation.

- Nullipara or Para 0: no pregnancy reached 28 weeks
- Primipara or Para 1: one birth after 28 weeks
- Para 2: two births after 28 weeks
- Multipara: two or more births after 28 weeks (number not specified)
- Grand multipara: five or more births after 28 weeks.

For women who can't tell you the exact number of gestational weeks, any delivery they think was after about 7 months (30 weeks) counts in the parity number.

■ A woman comes to your Health Post in labour at full term. She tells you that she has previously given birth to two live babies (both at the gestational age of 40 weeks), and one dead baby (stillbirth) at 32 weeks. She also had a spontaneous miscarriage at 26 weeks. Record the gravidity and parity of this woman.

□ She will be Gravida 5: she has had 2 live babies + 1 dead baby at 32 weeks + 1 miscarriage at 26 weeks + 1 current pregnancy. She will be Para 3: she has given birth to 2 live babies + 1 dead baby after 28 weeks.

Estimating the expected date of delivery

You should also ask when was the first day of her last normal menstrual period (LNMP). This will help you to calculate the **expected date of delivery** (**EDD**) and the gestational age of the fetus. Calculating the EDD and gestational age will help you to identify whether the labour is preterm, term or post-term. Often women do not recall their LNMP; in such cases it is useful to ask her when she first felt her baby's movement inside her (quickening or fetal kick). This occurs at approximately 18–20 weeks in primigravida mothers and 16–18 weeks in multigravidas.

2.2.4 Danger signs and symptoms

Ask her about any **danger symptoms** that she has noticed. (A **symptom** is something that a person experiences and can tell you about; a **sign** is something that only a trained health worker will notice, or can discover from an examination or test.)

■ Can you recall the danger symptoms in pregnancy from Study Session 17 of the *Antenatal Care* Module?

□ Danger symptoms include vaginal bleeding (heavier than show), persistent headache, blurring of vision, convulsions, loss of consciousness, epigastric or severe abdominal pain, fever, leakage of amniotic fluid before the onset of labour, and abnormal vaginal discharge. If she reports any of the above danger symptoms, refer the mother to the nearest health facility as soon as possible.

2.3 Physical examination in labour

When you physically examine a woman in labour, your focus will be on her abdomen, vagina and cervix, so remember to:

- Maintain her privacy
- Follow the principles of woman-friendly care (see Box 2.1)
- Examine her comprehensively (head to toe)
- Look for signs of anaemia (paleness inside the eyelids, pale fingernails and gums)
- Look for yellowish discoloration of the eyes (jaundice), which indicates liver disease.

2.3.1 Inspection of the abdomen

In order to memorize what aspects to inspect on the abdomen of a woman in labour, you can take the initial 'S' letters of the three points to look out for: size, shape and scars.

- **Size**: Is the abdomen too big or too small for the gestational age of the fetus? If it is too small, the baby may not have developed properly; if it is too big, the woman may have twins, or a condition called **polyhydramnios** (too much amniotic fluid). If the abdomen is either too big or too small, refer the mother to a health facility.

- **Shape**: Does the abdomen have an oval shape (like an egg — a little bit wider at the top of the uterus and narrower at the lower segment)? At near to full term, or in labour, this shape usually indicates that the baby is presenting 'head-down'. If it is round like a ball, it may indicate an abnormal presentation (as you will learn below, and in Study Session 8).
- **Scar**: Observe if she has a scar from an operation in the lower abdomen, from a previous caesarean delivery (Figure 2.3); the scar will usually be just above her pubic bone; if she has had surgery on her uterus previously, refer her to the nearest health facility. Scarring of the uterus puts her at risk of uterine rupture during the current delivery (as you will learn in Study Session 10).

Figure 2.3 Previous caesarean surgery increases the risk during the next labour.

2.3.2 Palpation of the abdomen

Palpation means feeling the abdomen with your hands in specific positions, or moving them in particular ways, using certain levels of pressure. Ask the mother to lie down on her back and bend her legs at the knees, with her feet flat on the bed. You need to be able to move around her: sometimes you will be palpating her abdomen while standing at her feet and looking up her body towards her head; sometimes you will be standing behind her and facing her feet; and sometimes you will stand beside her.

■ Can you recall the purposes of abdominal palpation in a woman in labour? (They are the same as during the pregnancy; see *Antenatal Care* Module, Study Session 11.)

□ Palpation helps you to assess the *size* of the fetus, its **presentation** (which part of the baby will 'present' at the cervix during delivery), and its **position** relative to the mother's body (e.g. is it facing towards her front or her back).

There are four palpations of the abdomen, which are commonly referred to by midwives and doctors as **Leopold's manoeuvres**. You need to do them in the correct sequence.

First Leopold's manoeuvre: fundal palpation

Fundal palpitation means palpating the dome-shaped upper part of the uterus, called the **fundus**. During antenatal care, you should have been measuring the length of the uterus from the mother's pubic bone to the

fundus, and comparing this with the baby's gestational age to see if it was growing normally. The purpose of palpating the fundus in a woman in labour is to discover how the baby is lying in the uterus.

Use the palms of both hands to palpate on either side of the fundus, with your fingers quite close together (see Figure 2.4). Feel whether the top part of the uterus is hard and rounded or soft and irregular. If the shapes feel soft and irregular and they don't easily move under gentle pressure from your hands, then the baby's buttocks are occupying the fundus (as in Figure 2.4) and it is 'head-down'. This is **cephalic presentation** (cephalic means head). There are several different cephalic presentations, which you will learn about in Study Session 8. The most common, and the easiest for the baby to be born, is called the *vertex* presentation.

Figure 2.4 Fundal palpation — the first manoeuvre. This baby is in a cephalic (head-down) presentation. (Source: WHO, 2008, *Managing Prolonged and Obstructed Labour,* Figure 7.4, page 115)

If you can feel a hard, round shape in the fundus, this is the baby's head. In a woman who is already in labour, this means the baby is in the **breech presentation** (the buttocks are the presenting part). It is safest to refer a woman whose baby is in the breech position because the birth is likely to be more difficult and the risk of complications is higher. If the fundus feels 'empty', the baby may be lying diagonally or transversely across the uterus. The second manoeuvre will help to clarify this.

Second Leopold's manoeuvre: lateral palpation

The second manoeuvre helps you to discover the **fetal lie**: is the baby lying *longitudinally* (straight), *obliquely* (diagonally across the uterus), or *transversely* (horizontally)? The longitudinal lie is normal (see Figures 2.4 above, and 2.5 on the next page). A transverse lie in labour should be referred urgently; the baby cannot be born through the vagina in this position and may need caesarean surgery to deliver it.

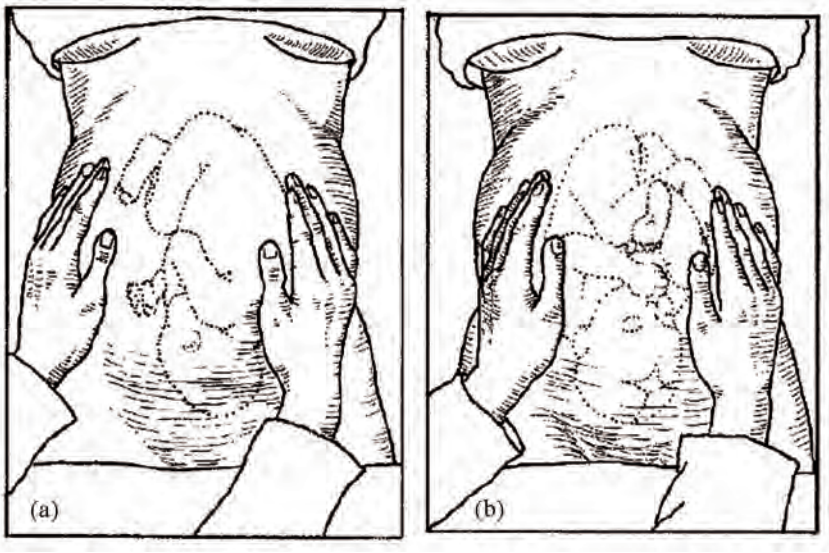


Figure 2.5 Lateral palpation–the second manoeuvre. (a) The back of the fetus is towards the front of the mother's abdomen; (b) The back of the fetus is towards the mother's back. (Source: WHO, 2008, *Managing Prolonged and Obstructed Labour,* Figures 7.4 and 7.5, pages 115 and 116)

Place your hands on either side of the middle of her abdomen. Push gently with one hand while holding the other hand firm to steady the uterus; alternate the pressure between your two hands. If you feel the round, hard shape of the baby's head at one side, and the fundus feels empty, it may be a transverse lie and you should refer the mother urgently.

The second manoeuvre also helps to determine whether the baby is facing inwards or outwards. Note the regularity of the shapes you can feel under your hands. If you can feel a large smooth shape under one hand, this is probably the baby's back, which means it is facing inwards (Figure 2.5a). In this starting position it is easier for the baby to begin the *seven cardinal movements* you learned about in Study Session 1 (look back at Figure 1.3). If you can feel small irregular 'lumps' under your hands, these are probably the baby's feet, knees and elbows and it is facing outwards (Figure 2.5b). It is not so easy for it to rotate as it passes down the birth canal from this starting position.

Third Leopold's manoeuvre: deep pelvic palpation

The third manoeuvre helps to confirm your earlier findings about the fetal presentation—is it cephalic or breech?

- What is cephalic presentation?
- The fetus is head down with its buttocks occupying the fundus (the upper part of the uterus).

Face the woman's feet and place your hands on the lower part of her abdomen, with your fingers gently pressing inwards just above her pubic bone (see Figure 2.6). You are feeling for the presenting part of the fetus as it engages with the cervix. If it is hard and round, the presentation is cephalic; if it is softer and irregular, suspect a breech presentation.

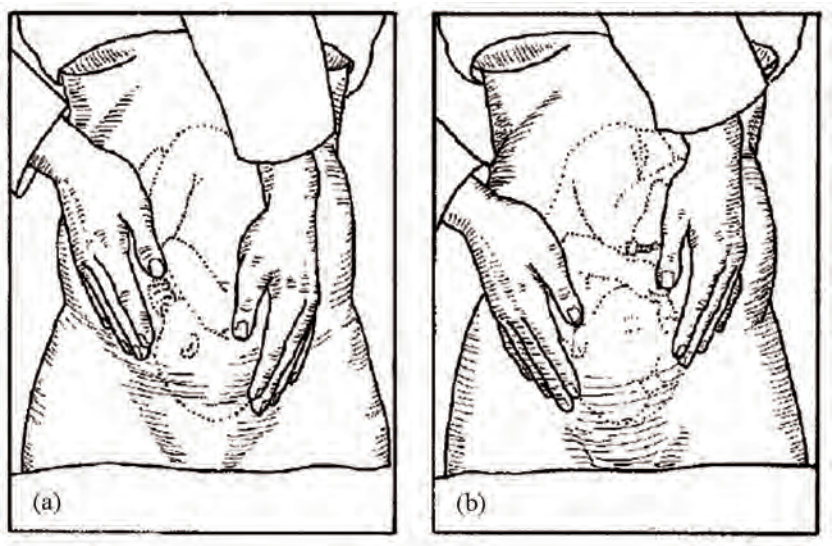


Figure 2.6 Deep pelvic palpation–the third manoeuvre helps to determine the presenting part. Both these babies are in cephalic presentation, but (a) is in the occipito-anterior position, whereas (b) is occipito-posterior. (Source: WHO, 2008, as in Figure 2.5)

You may also be able to confirm your findings from the second manoeuvre about whether the baby has its back towards you or not. If it does, this is called the **occipito-anterior position**: the **occiput** is the point at the back of the fetal skull, which is lying in the *anterior* position (Figure 2.6a), that is, towards the *front* of the mother. A baby that presents in the **occipito-posterior** position (Figure 2.6b) may encounter more difficulties during delivery.

You learned directional terms in anatomy, like anterior and posterior, in Study Session 3 of the *Antenatal Care* Module, Part 1.

Fourth Leopold's manoeuvre: Pawlick's grip

The purpose of the fourth manoeuvre (also known as Pawlick's grip) is to help determine whether the fetal head (in a cephalic presentation) has descended into the mother's pelvis and *engaged* in the cervix. (Engagement was explained in Study Session 1.) The extent of engagement is estimated by how many fingers you can grip the fetal head with (Figure 2.7). If all five fingers can grip the fetal head just above the mother's pubic bone, the head is not yet engaged. When you can only grip it with the width of two fingers, the head is engaged.

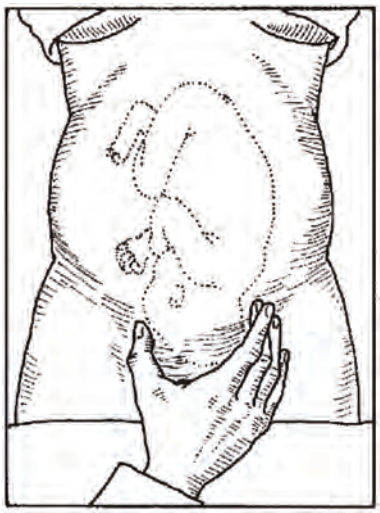


Figure 2.7 Pawlick's grip — the fourth manoeuvre helps to determine whether the presenting part has engaged. (Source: WHO, 2008, as in Figure 2.4)

2.3.3 Measuring fetal heart rate

Auscultation is pronounced 'oss-kool-tay-shun'.

Use a fetoscope or stethoscope to listen to the fetal heart rate *immediately after* a contraction. Listening to sounds inside the abdomen is called auscultation. Count the number of fetal heartbeats for a full minute at least once every 30 minutes during the active phase first stage of labour and every 5 minutes during the second stage. If there are fetal heart rate abnormalities (less than 120 or more than 160 beats per minute, sustained for 10 minutes), suspect fetal distress and refer urgently to a health facility, unless the labour is progressing fast and the baby is about to be born. (You will learn about fetal distress in Study Session 4.)

2.3.4 Measuring contractions

To assess the frequency and duration of contractions, put your hand over the mother's abdomen, around the fundus. You will sense the abdomen starting to tighten and become hard. The mother may make 'pain' sounds with the contraction. Count the **frequency**, i.e. number of contractions in 10 minutes, and the **duration** (the time elapsed during each contraction in seconds). You will learn how to record these measurements, the mother's vital signs and your measurements of the fetal heart rate on a chart called a *partograph* in Study Session 4.

2.3.5 Vaginal examination

The functions of a vaginal examination are to:

- Determine if true labour has begun and the stage it has reached, based on measuring the dilatation of the cervix
- Assess the progress of labour in terms of the rate of increase in cervical dilatation and the descent of the fetus down the birth canal
- Identify the fetal presentation and position
- Detect any **moulding** of the fetal skull bones (the extent to which they overlap under pressure from the birth canal)
- Assess the size of the mother's pelvis and its adequacy for the passage of the fetus
- Check the colour of the amniotic fluid.

In this study session, we will only focus on the first of these reasons for conducting a vaginal examination: assessing the stage of labour by measuring the dilatation of the cervix. All of the other functions of vaginal examination will be covered in later study sessions.

Assessing cervical dilatation

Wash your hands thoroughly with soap and clean water for two full minutes. Then put on new sterile gloves. Tell the mother what you are going to do. **Vaginal examination** is done using two gloved fingers. Try to collect all the information you need before withdrawing from the vagina, because once you have withdrawn your fingers you should not put them back in again.

■ Can you explain why not?

□ Putting your examining fingers back into the vagina could introduce infection.

In particular repeated vaginal examination causes infection: it should not be done more often than every 4 hours, unless there is a justifiable need (e.g. to confirm second stage of labour).

The woman should lie down on her back, bend her legs and open her knees. Gently swab the external genitalia with sterile gauze dipped in antiseptic solution. Separate the labia with two fingers on your non-dominant hand (the dominant hand is the one you write with). Dip your examining fingers (index and middle fingers) into an antiseptic lubricating cream and insert them very gently into the vagina, following the direction of the vagina, upwards and backwards. Ask the woman to take deep breaths and try to relax, as this will help to decrease the discomfort of the procedure.

Cervical dilatation is the increase in diameter of the cervical opening, estimated in centimeters. Dilatation happens after the cervix has *effaced* (the 3 cm length of the cervix has been drawn up into the uterus, as you saw in Figure 1.1 in the previous study session.) Estimating the diameter of the cervical opening takes practice. Activity 2.1 will help you.

Activity 2.1 Practice measuring cervical dilatation

Allow about 20 minutes for this activity. You will need a piece of hard paper or thin card, a ruler, compass (for drawing circles), pencil and scissors.

1 Make 10 circles on the hard paper, with increasing diameters: 1 cm, 2 cm, 3 cm, etc. up to 10 cm.

2 Leave a wide margin around each circle and cut the card into 10 squares of *the same size*.

3 Remove the inside of each circle with scissors.

4 Write the diameter of each circle on the card.

5 Choose a circle and place one or both your examining fingers into the hole. Can you get both fingers into the hole? Then cover your eyes and try to estimate the diameter of the hole in centimetres.

6 Try to estimate the diameter of each hole with your eyes closed. Then check to see if you are correct. Try this repeatedly.

■ From Study Session 1, what diameter will the cervix have reached when the labour progresses from (a) latent to active first stage? (b) active first stage to second stage?

□ (a) 4 cm; (b) 10 cm (fully dilated).

2.3.6 Assess the external genitalia and vagina

The final assessment we will describe in this study session is to check the mother's external genitalia and the inner surface of her vagina for warning signs. Look carefully to see if there is:

In the *Postnatal Care* Module you will learn how to put ointment (tetracycline) in the newborn's eyes to protect them from infection acquired from the mother's birth canal.

- Any abnormal discharge (thick yellowish or white and foul smelling) from the vagina, or inflamed sores on the external genitalia, which may be due to a urinary tract infection or sexually transmitted infection.
- Vaginal scarring due to injury during a previous birth, or from female genital mutilation (circumcision). This increases the risk of a **fistula** occurring during labour (a torn opening between the vagina and other organs).
- Is there swelling in the vagina, and if there is, could it obstruct the passage of the baby?

If you see any of the signs above, you should refer the mother to a health facility, unless the labour is advanced and the baby is about to be born. In the next study session, we describe how to care for the woman in labour.

Summary of Study Session 2

In Study Session 2 you have learned that:

1 Prepare your equipment for attending a labour and delivery in advance, so you are ready to go immediately if called.

2 Make a rapid evaluation of the labouring woman's vital signs (blood pressure, pulse rate and temperature).

3 Follow the principles of woman-friendly care by respecting her beliefs, wishes and rights, and empowering her and her chosen caregivers to support the labour and delivery.

4 Ask about and record the woman's name, age, address, gravidity and parity, last menstrual period, when she first felt the fetus move, and how long since the first contraction.

5 Ask about danger symptoms: vaginal bleeding, headache, convulsions, breathing difficulties, fever, severe abdominal pain or premature leakage of amniotic fluid (waters breaking).

6 Use abdominal palpation using the four Leopold's manoeuvres to determine the fetal presentation and position, and the extent of engagement of the presenting part.

7 Do your vaginal examination of the woman in labour to assess cervical dilatation, fetal presentation and descent, the condition of the fetal skull, and signs of vaginal infection, scarring or swelling.

Self-Assessment Questions (SAQs) for Study Session 2

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the following questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 2.1 (tests Learning Outcome 2.2)

Imagine that you are called to the home of a young woman. She is in labour. What do you immediately do?

SAQ 2.2 (tests Learning Outcome 2.5)

You are using abdominal palpation as part of your physical assessment of labour for a mother in your care. Fill in the empty boxes in Table 2.1 below.

Table 2.1 Leopold's manoeuvres.

Name of palpation	Area of the abdomen to be palpated	What you are checking
Fundal palpation		
	Hands placed flat on either side of the middle of the abdomen; first one and then the other pushes inwards	
	Facing the feet, with hands on the lower part of her abdomen, press inwards with your fingers just above her pubic bone	
		Whether the fetal head has engaged in the cervix - if you can only grip it with two finger — width above the mother's pubic bone, the head is engaged

SAQ 2.3 (tests Learning Outcomes 2.3 and 2.4)

Makeda has come to your Health Post. You have done your initial rapid assessment, and there is no need for instant referral. You are now taking her history. How do you go about doing this and what information do you need to check with her?

SAQ 2.4 (tests Learning Outcomes 2.6 and 2.7)

You now have Makeda's history and are carrying out a physical examination. What do you do first and what are you looking for?

SAQ 2.5 (tests Learning Outcome 2.1)

Which of the following statements is *false*? In each case, say what is incorrect.

(a) A temperature of 39°C indicates a **high grade fever**.
(b) The **gestational age** is how old the mother is when she becomes pregnant.
(c) **Parity** is the number of babies delivered alive after 28 weeks of gestation.
(d) **Gravidity** is the total number of previous pregnancies regardless of the outcome.
(e) The three points to look out for when inspecting a women's abdomen in labour are **size, shape** and **scars**.
(f) **Fundal palpation** is the drum-like beat you sometimes hear when listening to the baby's heart with a fetoscope.
(g) **Breech presentation** indicates potential complications during delivery.
(h) **Ausculation** is the sound mothers in labour sometimes make.

Study Session 3
Care of the Woman in Labour

Introduction

In the previous session of this Module you were introduced to the definitions, signs and symptoms, and stages of normal labour. Labour and birth of the baby is a unique experience in the life of any family and one of special personal significance for the mother. Your constant companionship and skilful management of the birth can contribute much to the harmonious atmosphere and feeling of trust during labour and delivery, which favours a good outcome. Caring for the woman in labour demands sensitivity from you as the birth attendant, and awareness of the mother's perception of her labour and of her needs, as they relate to her experience.

In this session you will learn about ways that you can support a woman all through the birth of the baby. You will also be introduced to the basic principles of maternal and fetal monitoring during labour, and learn about standard hygiene for infection prevention and the equipment you need to prepare for a delivery at home or in a health facility.

Learning Outcomes for Study Session 3

When you have studied this session, you should be able to:

3.1 Define and use correctly all of the key terms printed in **bold**. (SAQ 3.7)

3.2 Assess the individual needs of the woman in labour and provide care accordingly. (SAQs 3.1 and 3.7)

3.3 Provide emotional and psychological support for the woman in labour. (SAQ 3.1)

3.4 Perform proper maternal and fetal monitoring and recording in the first and second stages of labour. (SAQs 3.2, 3.3, 3.5 and 3.6)

3.5 Prepare delivery equipment for a normal birth. (SAQ 3.4)

3.6 Adopt standard hygiene precautions and infection prevention in delivery care. (SAQs 3.4 and 3.7)

3.1 Assessing the needs of the woman in labour

Every woman needs a different kind of support. But all women need kindness, respect and attention. Watch and listen to her to see how she is feeling. Encourage her, so she can feel strong and confident in labour. Help her relax and welcome her labour.

3.1.1 Support the labour

When you support the mother's labour, you help her relax instead of fighting against it (Figure 3.1). Although labour support will not make labour painless, it can make labour easier, shorter and safer. You will learn many ways to support the labour in this study session, including by physical actions (touch, sounds, etc.) and giving psychological and emotional support.

Figure 3.1 Help the woman in labour to relax.

3.1.2 Guard the labour

When you guard the labour, you protect it from interference.

Keep rude and unkind people away. The mother should not have to worry about family problems. Sometimes even supportive and loving friends can interfere with the labour. At some births, the best way to help is to ask everyone to leave the room so that the mother can labour without being distracted.

Do not use unnecessary drugs or procedures! Do not give the mother drugs to hurry the labour — they add useless risks.

Some people believe that more drugs, tools and examination of the mother will make the birth safer. But that is usually not true — they can make the birth harder or cause problems. Injections or pills that are supposed to hurry the birth can make labour more painful, and can kill both the mother and the baby.

3.1.3 Position and mobility

Several considerations govern the choice of position during the first stage of labour. Of these the most important is that of **maternal preference** — how she prefers to give birth. But some women need your encouragement to try different positions.

Help the woman move during labour. She can squat, sit, kneel or take other positions (Figure 3.2). All of these positions are good. Changing positions helps the cervix open more evenly.

Figure 3.2 Changing position in the first stage helps the mother to cope better with her labour.

3.1.4 Helping the mother to manage her contractions

In early labour she may be able to sleep. Many women feel very tired when their contractions are strong. They may fear they will not have the strength to push the baby out. But feeling tired is the body's way of making the mother rest and relax. If everything is all right, she will have the strength to give birth when the time comes.

To save her strength, the mother should rest between contractions, even when labour first begins. This means that when she is not having a contraction, she should let her body relax, take deep breaths, and sometimes sit or lie down.

3.1.5 Touch

Labour can be more difficult when the woman is afraid or tense. Reassuring the woman that the pain she has is normal can help lessen that fear. Touch can help a woman in labour, but find out what kind of touch she wants. Here are some examples of touch that women often like:

- A firm, still hand pressing on the lower back during contractions
- Massage between contractions, especially on the feet or back
- Hot or cold cloths on the lower back or belly (Figure 3.3). If the mother is sweating, a cool wet cloth on the forehead usually feels good.

Figure 3.3 A warm wet cloth or a gentle massage on the lower back can relieve labour pain.

Do not massage the belly. It will not speed labour and can cause the placenta to separate too soon. (You already learned about premature separation of the placenta and late pregnancy bleeding in Study Session 21 of the *Antenatal Care* Module, Part 2. It can also happen too soon during labour.)

3.1.6 Sounds

Making sounds in labour can help women to allow the birth canal to open. Not all women want to make noise, but encourage women to try. Low sounds, like growling animal noises or humming, can be very helpful. Some women chant or sing. The woman can be as loud as she wants to be.

Some noises can make women feel more tense. High-pitched sounds and screams usually do not help. If she starts to make high, tense sounds, ask her to make low sounds (Figure 3.4).

Figure 3.4 You can make low sounds yourself to guide her.

3.1.7 Breathing

The way a woman breathes can have a strong effect on how her labour will feel. In the first stage of labour, there are many kinds of breathing that may make labour easier. Try these ways of breathing yourself and show the mother how to do it. Help her to choose which one works best to minimize the pain. Encourage mothers to try different ways of breathing throughout labour:

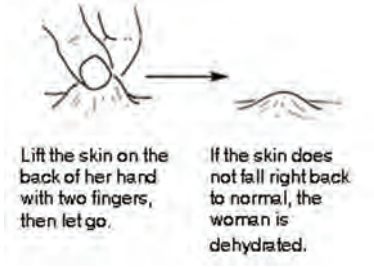
- *Slow blowing*. Ask the woman to take a long, slow breath. To breathe out she should make a kiss with her lips and slowly blow. Breathing in through the nose can help her breathe slowly.
- *Hee breathing*. The woman takes a slow deep breath and then blows out short, quick breaths while she makes soft 'hee, hee' sounds.
- *Panting*. The woman takes quick, shallow breaths.
- *Strong blowing*. The woman blows hard and fast.

3.1.8 Drinking fluids during labour

A woman in labour uses up the water in her body quickly and she also uses up a lot of energy. During the first stage of labour, she should drink at least 1 cup every hour of a high calorie fluid such as tea, soft drinks, soup, or fruit juice. If she does not drink enough, she may get dehydrated (not enough water in the body). This can make her labour much longer and harder. Dehydration can also make a woman feel exhausted.

Signs of dehydration include:

- Dry lips
- Sunken eyes
- Loss of stretchiness of skin
- Mild fever (up to 38°C)
- Fast, deep breathing (more than 20 breaths a minute)
- Fast, weak pulse (more than 100 beats a minute)
- Baby's heartbeat faster than 160 beats a minute.



3.1.9 Bladder care

Encourage the woman to urinate at least once every 2 hours (Figure 3.5a). If her bladder is full, her contractions may get weaker and her labour longer. A full bladder can also cause pain, problems with pushing out the placenta, and bleeding after childbirth. Remind the mother to urinate – she may not remember.

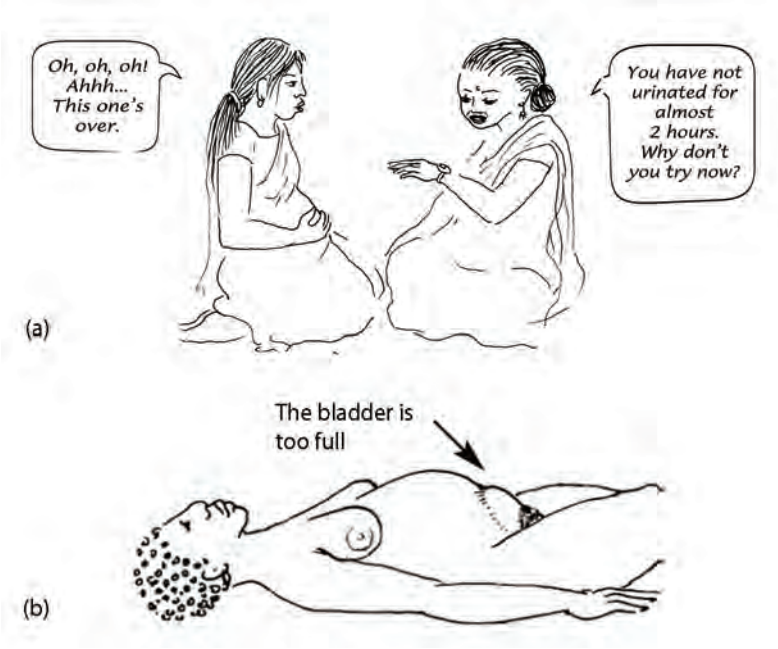


Figure 3.5 (a) Encourage her to urinate at least every 2 hours. (b) A full bladder can prolong labour and cause pain.

To check if the bladder is full, feel the mother's lower belly. A full bladder feels like a plastic bag full of water. When the bladder is very full, you can see the shape of it under the mother's skin (Figure 3.5b). Do not wait until her bladder gets this big.

If the mother's bladder is full, she must urinate. If she cannot walk, try putting a pan or extra padding under her bottom and let her urinate where she is. It may help her to begin to urinate if you dip her hand in warm water.

- Why do you think a full bladder can interfere with the normal progress of labour? (Think back to what you know from the previous two study sessions.)

- During the first and second stage of labour, a full bladder interferes with the normal uterine contraction and inhibits the baby's head from entering the pelvic brim.

As you will see in Study Session 6, during the third stage of labour it can also delay delivery of the placenta, which increases the risk of post-partum haemorrhage (Study Session 11).

3.1.10 Emotional and psychological support for the woman in labour

Emotional and psychological support for the woman in labour consists of helping the mother to feel in control of herself, to feel accepted whatever her reactions and behaviour may be and to complete her labour feeling that she is a success, even if the outcome was not what she hoped for. There are several ways you can help her to achieve this.

Companion in labour

You do not have to work alone to give support to the mother during labour. There is evidence that the presence of constant support from the woman's husband, close relatives or friends in labour favours good progress. There is no rule about who should support her if they care about her and are willing to help her. Most important, they should be people the mother wants to have at the birth.

Good communication

Keep the woman informed about the progress of labour. The woman has the right to know about the progress of labour and the condition of herself and the baby. Counsel the woman and her support person about ongoing care such as physical care, comfort and emotional support.

Counsel the woman (and her support person) what to expect early in labour, before contractions become too painful, and later when contractions become stronger (where feasible). Explain about the contractions getting stronger and closer together as she gets closer to the time to deliver baby. Explain what to expect during the delivery. Reassure the woman that you will be with her throughout the process of giving birth.

3.2 Maternal and fetal monitoring during labour

Proper maternal and fetal monitoring during labour is very important as this is the only way to assess the progress of labour and to identify deviations from normal.

3.2.1 Assessing the progress of labour

Labours are all different. Some are fast, some are slow. This is normal. But in a healthy labour, there should be progress. **Progress** means that labour should

be getting stronger and the cervix should be opening. Box 3.1 (on the next page) summarizes the main features of a labour that is progressing normally.

Figure 3.6 Reassure the mother that contractions get stronger because the labour is going well.

Box 3.1 Gradual progress of normal labour

- Contractions get longer, stronger and closer together.
- The uterus feels harder when you touch it during a contraction (Figure 3.6).
- Amount of 'show' increases.
- The bag of waters breaks.
- The mother burps, sweats and vomits, or her legs shake.
- The mother feels she wants to push down through her lower abdomen.

In Study Session 4 you will learn how to use a chart called a **partograph** to assess the progress of labour and record your observations and measurements accurately. But first we are going to describe what happens in the woman's body to introduce you to the important features that need to be assessed during labour.

3.2.2 Uterine contractions

The frequency, length and strength of the contractions should be monitored and recorded every half hour. **Frequency** indicates the number of contractions the woman has in ten minutes. Count them. **Length** refers to the amount of time each contraction lasts. Measure the time on your watch (if you have one). **Strength** indicates the severity of pain experienced during each contraction; ask the mother to tell you about this.

In normal labour, as the labour progresses the contractions become more frequent, they last longer, and they feel stronger to the mother (more painful).

3.2.3 Dilatation of the cervix

The progress of labour is usually assessed by the degree of dilatation of the cervix. Cervical dilatation is assessed by doing a vaginal examination every four hours and using your fingers to estimate how wide the cervix has opened. (We described how to do this in Study Session 2). In normal labour the average rate for cervical dilatation is one centimetre every hour (1 cm per hour).

3.2.4 Descent of the presenting part

You measure descent of the presenting part of the fetus by abdominal palpation in relation to the pelvic brim. The descent of the presenting part can also be detected by vaginal examination. This should be assessed and recorded every two hours during the labour.

3.2.5 Discharges from the vagina

Show is the name given to the blood-stained mucus seen in early labour. Towards the end of the first stage a trickle of blood may appear. Amniotic fluid may be seen trickling from the vagina after the membranes have ruptured. The presence of **mechonium** (dark-green coloured discharge, which

Mechonium is pronounced 'mee-koh-nee-um'.

is the first stool of the baby) in the amniotic fluid suggests fetal distress as it does not normally pass stool until after the birth. Later in this Module, you will learn what actions to take if the fetus or the mother is endangered.

3.2.6 Fetal condition

The fetal condition during labour can be assessed by obtaining information about the fetal heart rate (the number of beats per minute) and its pattern in relation to the mother's contractions. Check the fetal heart rate every 30 minutes by listening (auscultation), which you learned to do in Study Session 11 of the *Antenatal Care* Module using a fetoscope or stethoscope.

■ Do you remember what is the normal range of the fetal heart rate?

□ Normal fetal heart rate ranges from 100–180 beats per minute.

3.2.7 Maternal condition

Count the woman's pulse rate every 30 minutes and measure her blood pressure and temperature every four hours, as you learned how to do in Study Session 9 of the *Antenatal Care* Module. Additionally, document on your labour monitoring chart how often the mother eats, drinks and urinates.

Blood pressure goes down

If her diastolic blood pressure (the bottom number) suddenly drops 15 points or more, this is a dangerous warning sign. This usually means that the mother is bleeding heavily. If you do not see any bleeding from her vagina, her placenta may have detached and she might have bleeding inside (**intrapartum haemorrhage**).

If the woman's blood pressure suddenly drops, she needs to go to the hospital immediately!

Blood pressure goes up

Blood pressure of 140/90 mmHg or higher is a warning sign. The woman may have pre-eclampsia, which can cause convulsions (eclampsia), detached placenta, bleeding in the brain, or a severe haemorrhage. The baby may die and the mother may die as well. You learned all about eclampsia and pre-eclampsia in Study Session 19 of the *Antenatal Care* Module, Part 2. Blood pressure and all the other measurements outlined above are recorded on the partograph, as you will learn in the next study session.

Next we turn to the equipment you will need to prepare for the delivery.

3.3 Preparing to conduct a delivery

When the woman is approaching the second stage of labour you should prepare for the delivery of the baby.

3.3.1 Signs of second stage labour

- Contractions becomes stronger and more expulsive.
- Dilation and 'gapping' of the anus (the anal sphincter opens during the contraction).
- Appearance of the presenting part of the fetus under the vulva.
- Full dilation of the cervix to a diameter of 10 cm.

3.3.2 Preparing the birthing place

Once the onset of the second stage has been confirmed you should make preliminary preparations for the delivery. The room should be warm and well lit so that the perineum and vulva can be easily observed. A clean surface should be prepared to receive the baby (Figure 3.7) using the infection control procedures described in Section 3.5. Spread waterproof covers to protect the bed and the floor. Make sure there is a warm coat and clothes for the baby.

Figure 3.7 Supplies to conduct the delivery include making a safe and clean place for the mother to give birth.

3.3.3 Equipment and supplies needed to conduct delivery

You should always have all the supplies and tools you will need for the birth (Box 3.2 and Figure 3.8) ready at the Health Post and you should take them to the woman's home if the delivery is going to happen there. She may be able to provide some of the simplest things, like soap and clean cloths, but you should always be fully prepared. Use Box 3.2 as a checklist — tick each item as you pack it to go to a birth.

Box 3.2 Checklist of birthing equipment

- Clean water, soap and hand towel.
- Apron, goggle, face mask and gown.
- Sterile gloves.
- Sterile or very clean new string to tie the cord.
- New razor blade or sterilized scissors.
- Two sterile clamp forceps, for clamping the umbilical cord before you cut it.
- Mucus trap or suction bulb to suck mucus from the baby's airways (if needed).
- Sterile gauze, cotton swab and sanitary pad for the mother.
- Two dry, clean baby towels and two drapes.
- Blood pressure cuff and stethoscope.
- Antiseptic solution for cleaning the mother's perineum and genital area.

- 10 IU (international units) of the injectable drug called oxytocin, or 600 µg (microgram) tablets of misoprostol. These drugs are used for the prevention of post-partum haemorrhage. Oxytocin is the preferred drug for this purpose, but if you don't have it then misoprostol can be used. (You will learn all about this in Study Session 6.)
- Tetracycline eye ointment (antibiotic eye ointment used for the prevention of eye infection in the newborn; you will learn about this in the next Module, on *Postnatal Care*).
- Three buckets or small bowls each with 0.5% chlorine solution, or soap solution and clean water. (To prepare 0.5% chlorine solution you can use the locally available Berekina. Read the concentration from the bottle — if it is 5% you can make a solution of 0.5% strength by mixing one cup of Berekina with nine cups of clean water.)
- Plastic bowl to receive the placenta.

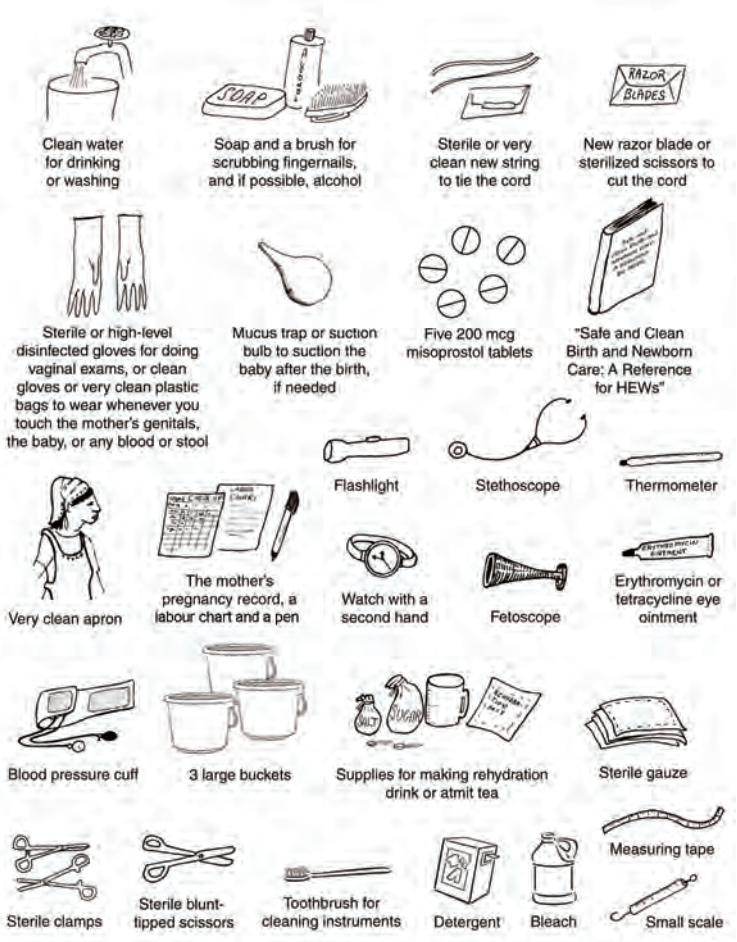


Figure 3.8 Equipment needed for attending a normal birth.

3.4 Preventing infection during delivery

Infection makes people sick and can even kill them. It is one of the most common causes of death after childbirth. Most of your actions during labour and delivery can be safe only if you are able to follow the basic rules to prevent infection, as outlined in this section. You can summarise these rules as the '**three cleans**': clean hands, clean surface (for the delivery) and clean

equipment. You already know you must thoroughly clean the place where the baby will be born. In addition, you should follow other standard hygiene measures as described below.

3.4.1 Handwashing

■ How can you prevent infection by washing your hands?

□ Washing your hands is one of the most important things you can do to prevent infection. It prevents you from spreading germs to another person, and it helps protect you from germs, too.

If you can do nothing else to prevent infection, you must wash your hands (see Figure 3.9 and Box 3.3).

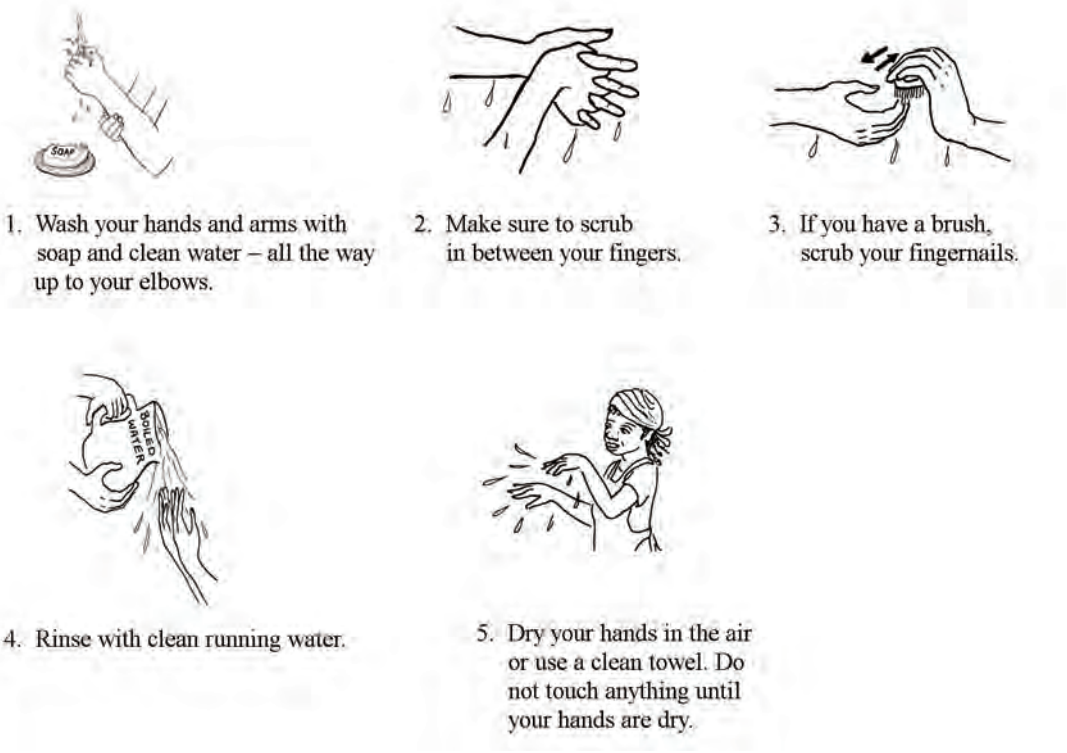


Figure 3.9 How to do a 2-minute handwash.

Box 3.3 Always do a 2-minute handwash

Before you	After you
Touch the mother's vagina	Clean up after the birth
Do a vaginal or pelvic examination	Touch any blood or other body fluids
Deliver the baby	Urinate or pass stool
Check the newborn	

Alcohol and glycerine hand cleaner

You can make a simple hand cleaner (rub) to use if you do not have water to wash your hands. When used correctly, this cleaner will kill most of the germs on your hands.

Mix 2 ml (millilitres) of glycerine with 100 ml of ethyl or isopropyl alcohol (strength 60% to 90%) or any alcohol used for skin cleaning before an injection.

To clean your hands, rub about 5 ml (1 teaspoon) of the hand cleaner into your hands, rub them together thoroughly and make sure to clean between your fingers and under your nails. Keep rubbing until your hands are dry. Do not rinse your hands or wipe them with a cloth.

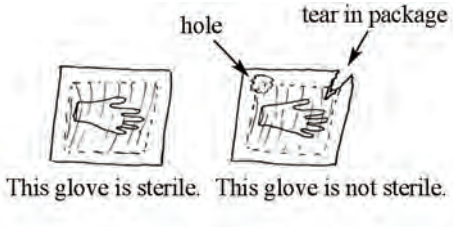
Wash your hands with soap and water after every 5–10 uses of the hand cleaner solution to reduce the build-up of hand softeners.

Do not use a hand rub if your hands are contaminated with body fluids or are visibly dirty; instead wash your hands with soap and water.

3.4.2 Wear protective clothing

Gloves

There are different kinds of gloves for different purposes. Utility or heavy duty gloves are used for touching dirty instruments, linens and waste; doing housekeeping; and cleaning contaminated surfaces. Sterile, single-use clean examination gloves are used when you will come into contact with unbroken mucus membranes (when you are doing a vaginal examination), or when you are at risk of exposure to blood or other body fluids. Sterile (germ-free) surgical gloves are used for all procedures having contact with tissues under the skin or with the bloodstream.



Wear gloves whenever you touch the mother's genitals, or any blood or body fluid. After use, discard the gloves safely.

Face mask, eye protection and apron or gown

A face mask, eye protection and a very clean apron or gown are worn for sorting and cleaning instruments and linens, attending a vaginal delivery, and cutting the umbilical cord. Eye protection can include goggles, face shields or plain glasses.

Feet protection

Feet protection should be a closed shoe or boot made from rubber or leather. If leather, cover the shoes with plastic bags. Shoes or boots protect the wearer from injury by sharp or heavy items, and the plastic bags protect you from blood or other body fluids on the floor.

3.4.3 Clean and high-level disinfect your tools

Before and after the baby has been born, **decontaminate** (remove germs) from all instruments with a 0.5% chlorine solution. First, soak them for 10 minutes, then wash with a soapy solution and lastly with clean water. You can use a small brush to scrub them clean. After decontamination make the instruments sterile (germ-free) by using a sterilizer machine, or boil them for 20 minutes. (If you have access to a sterilizer machine, follow the instructions carefully.)

3.4.4 Clean surface for delivery and safe disposal of birth wastes

Make sure the area where the mother will give birth is scrubbed clean, and that all cloths, towels or drapes are clean and dry — particularly those the mother lies on and the cloths you wrap around the newborn baby to clean it.

Put all wastes after the birth (blood, contaminated cloths, membranes and the placenta) in a leak-proof container such as a tin with a tight-fitting lid, and dispose of it safely in a proper place where it is unlikely to be found. It is usually recommended to bury wastes in the ground or burn them. It is very important to prevent other people in the community from getting sick from the germs left on these wastes.

Be careful with needles. When you have finished using a disposable syringe, put the needle into the safety box. Do not leave needles lying around.

3.5 In conclusion

Now that you know how to support the woman in labour, what equipment is needed and how to dispose of wastes, we can progress to teaching you about the delivery itself. In the next study session you will learn how to use the partograph.

Summary of Study Session 3

In Study Session 3 you have learned that:

1 All women during labour and delivery need individualized care. Pregnant women should be encouraged to seek support from a skilled birth attendant.

2 Provide physical and psychological support to the woman in labour and the trusted support person who is with her.

3 Assist her to adopt different positions, try different breathing patterns, be massaged on her back and make low sounds during labour, as this helps her to relieve pain and manage the contractions.

4 Encourage her to take one cup of fluid at least every hour and assist her to empty her bladder at least once every two hours.

5 Keep her informed about the progress of her labour, so she remains relaxed and confident.

6 Monitor fetal condition by checking the fetal heart beat every 30 minutes; it should be within the normal range.

7 Monitor maternal condition by measuring her blood pressure and temperature every 4 hours, and her pulse rate every 30 minutes.

8 Assess the progress of labour by checking uterine contractions (length, strength and frequency) every 30 minutes, descent of the head every two hours and cervical dilatation every four hours.

9 Prepare the equipment you will need for the birth, including protective clothing for yourself; scrub or sterilise everything that will come into contact with tissue or body fluids.

10 Hand washing with soap and clean water is the most important way to reduce the risk of infection being passed to the mother and baby during labour and delivery.

Self-Assessment Questions (SAQs) for Study Session 3

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the questions below Case Study 3.1. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

First read Case Study 3.1 and then answer the questions that follow it.

Case Study 3.1 Woizero Almaz

Woizero Almaz is a full term pregnant woman who came to the Health Post with pushing down pain and blood stained vaginal discharge which began five hours earlier. This is her first pregnancy and she is very anxious about it. On examination you found she is in first stage of labour.

SAQ 3.1 (tests Learning Outcomes 3.2 and 3.3)

What support can you give her to alleviate Woizero Almaz's fear about her condition?

SAQ 3.2 (tests Learning Outcome 3.4)

What assessment tools and means will you use to assess the progress of Almaz's labour? How will these assessments help you?

SAQ 3.3 (tests Learning Outcomes 3.5 and 3.6)

During the first stage of labour, what type of food will you recommend to her? And how often will you try to get her to eat something?

SAQ 3.4 (tests Learning Outcomes 3.5 and 3.6)

When you are providing care to Almaz during her labour, how do you prevent infection being transmitted to her and her baby?

SAQ 3.5 (tests Learning Outcome 3.4)

What will you assess (and how often) to check whether Almaz's labour is progressing normally?

SAQ 3.6 (tests Learning Outcome 3.4)

What would indicate that Almaz's baby is showing signs of fetal distress?

SAQ 3.7 (tests Learning Outcomes 3.1, 3.2 and 3.6)

Which of the following statements is *false*? In each case explain what is incorrect.

A Maternal preference means respecting how the mother wants to give birth.

B In the first stage of labour the mother should not drink anything in case she vomits.

C The frequency of contractions refers to how painful the contractions become.

D Meconium discharging from the vagina is a sign of fetal distress.

E The 'three cleans' are clean hands, clean surface for the delivery and clean equipment.

Study Session 4 Using the Partograph

Introduction

Among the five major causes of maternal mortality in developing countries like Ethiopia (hypertension, haemorrhage, infection, obstructed labour and unsafe abortion), the middle three (haemorrhage, infection, obstructed labour) are highly correlated with prolonged labour. To be specific, postpartum haemorrhage and postpartum sepsis (infection) are very common when the labour gets prolonged beyond 18–24 hours. Obstructed labour is the direct outcome of abnormally prolonged labour; you will learn about this in detail in Study Session 9 of this Module. To avoid such complications, a chart called a *partograph* will help you to identify the abnormal progress of a labour that is prolonged and which may be obstructed. It will also alert you to signs of fetal distress.

In this study session, you will learn about the principles of using the partograph, the interpretation of what it tells you about the labour you are supervising, and what actions you should take when the recordings you make on the partograph deviate from the normal range. When the labour is progressing well, the record on the partograph reassures you and the mother that she and her baby are in good health.

Learning Outcomes for Study Session 4

When you have studied this session, you should be able to:

4.1 Define and use correctly all of the key terms printed in **bold**. (SAQs 4.1 and 4.3)

4.2 Describe the significance and the applications of the partograph in labour progress monitoring. (SAQs 4.1 and 4.2)

4.3 Describe the components of a partograph and state the correct time intervals for recording your observations and measurements. (SAQs 4.1 and 4.3)

4.4 Describe the indicators in a partograph that show good progress of labour, and signs of fetal and maternal wellbeing. (SAQ 4.3)

4.5 Identify the indicators in a partograph for immediate referral to a hospital during the labour. (SAQ 4.3)

4.1 The value of using the partograph

The **partograph** is a graphical presentation of the progress of labour, and of fetal and maternal condition during labour. It is the best tool to help you detect whether labour is progressing normally or abnormally, and to warn you as soon as possible if there are signs of fetal distress or if the mother's vital signs deviate from the normal range. Research studies have shown that maternal and fetal complications due to prolonged labour were less common when the progress of labour was monitored by the birth attendant using a partograph. For this reason, you should *always* use a partograph while attending a woman in labour, either at her home or in the Health Post.

In the study sessions in this Module, you have learned (or will learn) the major reasons why you need to monitor a labouring mother so carefully. Remember that a labour that is progressing *well* requires your help *less* than a labour that is progressing *abnormally*. Documenting your findings on the partograph during the labour enables you to know quickly if something is going wrong, and whether you should refer the mother to the nearest health centre or hospital for further evaluation and intervention.

4.2 Finding your way around of the partograph

The partograph is actually your record chart for the labouring mother (Figure 4.1). It has an identification section at the top where you write the name and age of the mother, her 'gravida' and 'para' status, her Health Post or hospital registration number, the date and time when you first attended her for the delivery, and the time the fetal membranes ruptured (her 'waters broke').

■ What is the difference between a woman who is a multigravida and one who is a multipara?

□ A **multigravida** is a woman who has been pregnant at least once before the current pregnancy. A **multipara** is a woman who has previously given birth to live babies at least twice before now.

On the back of the partograph (if you are not using another chart), you can also record some significant facts, such as the woman's past obstetric history, past and present medical history, any findings from a physical examination and any interventions you initiate (including medications, delivery notes and referral).

4.2.1 The graph sections of the partograph

The graph sections of the partograph are where you record key features of the fetus or the mother in different areas of the chart. We will describe each feature, starting from the top of Figure 4.1 and travelling down the partograph.

- Immediately below the patient's identification details, you record the **Fetal Heart Rate** initially and then every 30 minutes. The scale for fetal heart rate covers the range from 80 to 200 beats per minute.
- Below the fetal heart rate, there are two rows close together. The first of these is labelled **Liquor** – which is the medical term for the *amniotic fluid*; if the fetal membranes have ruptured, you should record the *colour* of the fluid initially and every 4 hours.
- The row below 'Liquor' is labelled **Moulding**; this is the extent to which the bones of the fetal skull are overlapping each other as the baby's head is forced down the birth canal; you should assess the degree of moulding initially and every 4 hours

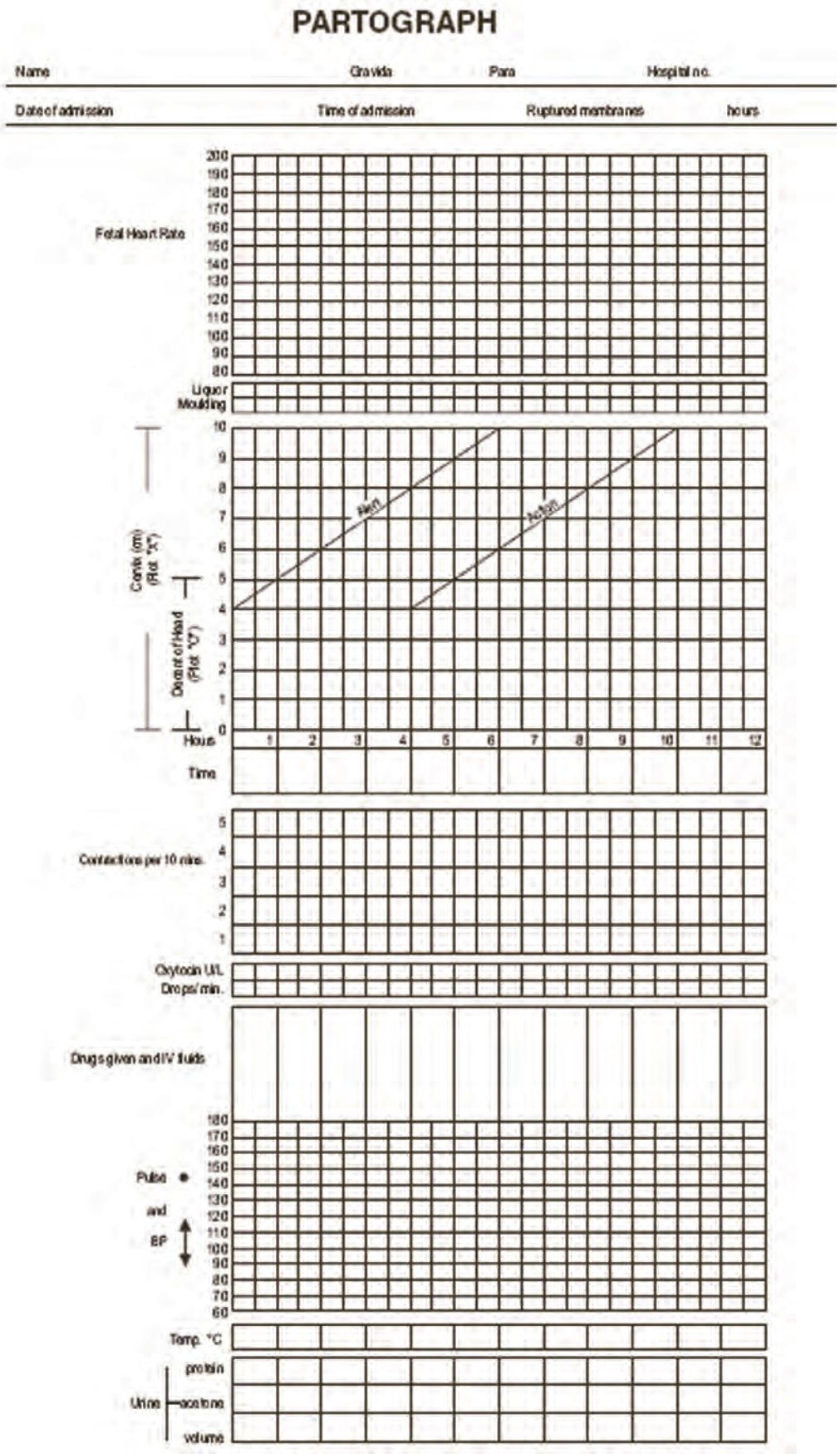


Figure 4.1 The partograph showing where to enter the patient's identification details at the top and the graphic component below.

- Below 'Moulding' there is an area of the partograph labelled **Cervix (cm) (Plot X)** for recording **cervical dilatation**, i.e. the diameter of the mother's cervix in centimetres. This area of the partograph is also where you record **Descent of Head (Plot O)**, which is how far down the birth canal the baby's head has progressed. You record these measurements as either X or O, initially and every 4 hours. There are two rows at the bottom of this section of the partograph to write the number of hours since you began monitoring the labour and the time on the clock.
- The next section of the partograph is for recording **Contractions per 10 mins** (minutes) initially and every 30 minutes.
- Below that are two rows for recording administration of **Oxytocin** during labour and the amount given. (You are NOT supposed to do this – it is for a doctor to decide! However, you will be trained to give oxytocin *after* the baby has been born if there is a risk of postpartum haemorrhage.)

You learned about giving IV (intravenous) fluid therapy to women who are haemorrhaging in Study Session 22 of the *Antenatal Care* Module.

- The next area is labelled **Drugs given and IV fluids** given to the mother.
- Near the bottom of the partograph is where you record the mother's *vital signs*; the chart is labelled **Pulse and BP** (blood pressure) with a possible range from 60 to 180. Below that you record the mother's **Temp °C** (temperature).
- At the very bottom you record the characteristics of the mother's **Urine: protein, acetone, volume**. You learned how to use urine dipsticks to test for the presence of a protein (albumin) during antenatal care.

■ What can you tell from the colour of the amniotic fluid?

□ If it has fresh bright red blood in it, this is a warning sign that the mother may be haemorrhaging internally; if it has dark green meconium (the baby's first stool) in it, this is a sign of fetal distress.

4.2.2 The Alert and Action lines

In the section for cervical dilatation and fetal head descent, there are two diagonal lines labelled **Alert** and **Action**. The Alert line starts at 4 cm of cervical dilatation and it travels diagonally upwards to the point of expected full dilatation (10 cm) at the rate of 1 cm per hour. The Action line is parallel to the Alert line, and 4 hours to the right of the Alert line. These two lines are designed to warn you to take action quickly if the labour is not progressing normally.

You should refer the woman to a health centre or hospital if the marks recording cervical dilatation *cross over* the Alert line, i.e. indicating that cervical dilation is proceeding too *slowly*. (The Action line is for making decisions at health-facility level.)

4.3 Recording and interpreting the progress of labour

As you learned in Study Session 1 of this Module, a normally progressing labour is characterized by at least 1 cm per hour cervical dilatation, once the labour has entered the *active first stage* of labour.

Another important point is that (unless you detect any maternal or fetal problems), every 30 minutes you will be counting fetal heart beats for one full minute, and uterine contractions for 10 minutes.

You should do a digital vaginal examination initially to assess:

- The extent of cervical *effacement* (look back at Figure 1.1) and cervical dilatation
- The presenting part of the fetus
- The status of the fetal membranes (intact or ruptured) and amniotic fluid
- The relative size of the mother's pelvis to check if the brim is wide enough for the baby to pass through.

Thereafter, in every 4 hours you should check the change in:

- Cervical dilatation
- Development of cervical oedema (an initially thin cervix may become thicker if the woman starts to push too early, or if the labour is too prolonged with minimal change in cervical dilatation)
- Position (of the fetus, if you are able to identify it)
- Fetal head descent
- Development of moulding and caput (Study Session 2 in this Module)
- Amniotic fluid colour (if the fetal membranes have already ruptured).

You should record each of your findings on the partograph at the stated time intervals as labour, progresses. The graphs you plot will show you whether everything is going well or one or more of the measurements is a cause for concern. When you record the findings on the partograph, make sure that:

- You use one partograph form per each labouring mother. (Occasionally, you may make a diagnosis of true labour and start recording on the partograph, but then you realise later that it was actually a false labour. You may decide to send the woman home or advise her to continue her normal daily activities. When true labour is finally established, use a new partograph and not the previously started one).
- You start recording on the partograph when the labour is in active first stage (cervical dilation of 4 cm and above).
- Your recordings should be clearly visible so that anybody who knows about the partograph can understand and interpret the marks you have made.

If you have to refer the mother to a higher level health facility, you should send the partograph with your referral note and record your interpretation of the partograph in the note.

■ Without looking back over the previous sections, quickly write down the partograph measurements that you must make in order to monitor the progress of labour.

□ Compare your list with the partograph in Figure 4.1. If you are at all uncertain about any of the measurements, then re-read Sections 4.2 and 4.3.

4.4 Cervical dilatation

As you learned in Study Session 1 of this Module, the first stage of labour is divided into the latent and the active phases. The **latent phase** at the onset of labour lasts until cervical dilatation is 4 cm and is accompanied by *effacement* of the cervix (as shown in Figure 1.1 previously). The latent phase may last up to 8 hours, although it is usually completed more quickly than this. Although regular assessments of maternal and fetal wellbeing and a record of all findings should be made, these are *not* plotted on the partograph *until* labour enters the active phase.

Vaginal examinations are carried out approximately every 4 hours from this point until the baby is born. The **active phase** of the first stage of labour starts when the cervix is 4 cm dilated and it is completed at full dilatation, i.e. 10 cm. Progress in cervical dilatation during the active phase is at least 1 cm per hour (often quicker in multigravida mothers).

In the cervical dilatation section of the partograph, down the left side, are the numbers 0–10. Each number/square represents 1 cm dilatation. Along the bottom of this section are 24 squares, each representing 1 hour. The dilatation of the cervix is estimated by vaginal examination and recorded on the partograph with an X mark every 4 hours. Cervical dilatation in multipara women may need to be checked more frequently than every 4 hours in advanced labour, because their progress is likely to be faster than that of women who are giving birth for the first time.

■ In the example in Figure 4.2, what change in cervical dilatation has been recorded over what time period?

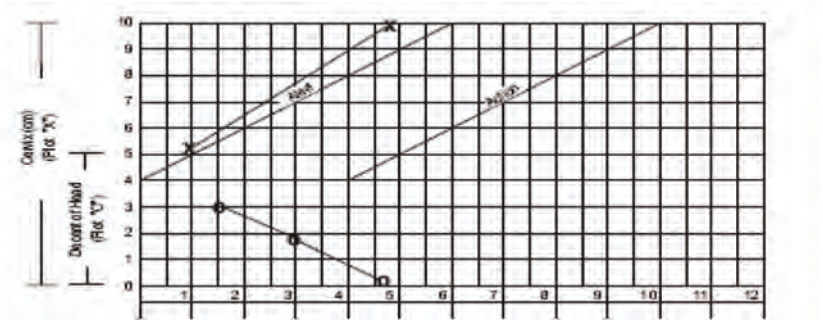


Figure 4.2 An example of how to record cervical dilatation (marked by Xs) and fetal head descent (marked by 0s) using a partograph.

□ The cervical dilatation was about 5 cm at 1 hour after the monitoring of this labour began; after another four hours, the mother's cervix was fully dilated at 10 cm.

If progress of labour is satisfactory, the recording of cervical dilatation will remain on, or to the left, of the alert line.

If the membranes have ruptured and the woman has no contractions, do not perform a digital vaginal examination, as it does not help to establish the diagnosis and there is a risk of introducing infection. (PROM, premature rupture of membranes, was the subject of Study Session 17 of the *Antenatal Care* Module.)

4.5 Descent of the fetal head

For labour to progress well, dilatation of the cervix should be accompanied by descent of the fetal head, which is plotted on the same section of the partograph, but using O as the symbol. But before you can do that, you must learn to estimate the progress of fetal descent by measuring the **station** of the fetal head, as shown in Figure 4.3. The station can only be determined by examination of the woman's vagina with your gloved fingers, and by reference to the position of the presenting part of the fetal skull relative to the ischial spines in the mother's pelvic brim.

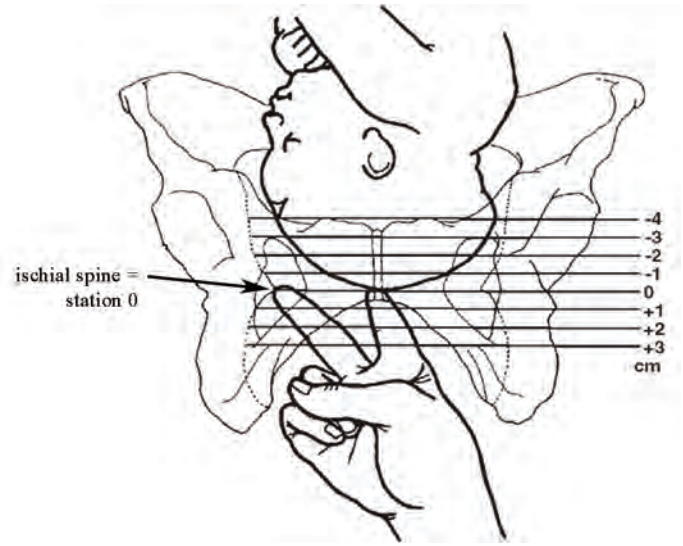


Figure 4.3 Assessing the station (descent) of the fetal head by vaginal examination, relative to the ischial spines in the mother's pelvic brim. (Source: WHO, 2008, *Midwifery Education Module: Managing Prolonged and Obstructed Labour,* Figure 7.28, page 132)

As you can see from Figure 4.3, when the fetal head is at the *same level* as the ischial spines, this is called station 0. If the head is *higher up* the birth canal than the ischial spines, the station is given a *negative* number. At station –4 or –3 the fetal head is still 'floating' and not yet engaged; at station –2 or –1 it is descending closer to the ischial spines.

If the fetal head is *lower down* the birth canal than the ischial spines, the station is given a *positive* number. At station +1 and even more at station +2, you will be able to see the presenting part of baby's head bulging forward during labour contractions. At station +3 the baby's head is **crowning**, i.e. visible at the vaginal opening even between contractions. The cervix should be fully dilated at this point.

Now that you have learned about the different stations of fetal descent, there is a complication about recording these positions on the partograph. In the section of the partograph where cervical dilatation and descent of head are recorded, the scale to the left has the values from 0 to 10. By tradition, the values 0 to 5 are used to record the level of fetal descent. Table 4.1 shows you how to convert the station of the fetal head (as shown in Figure 4.3) to the corresponding mark you place on the partograph by writing O. (Remember, you mark fetal descent with Os and cervical dilatation with Xs, so the two are not confused.)

When the baby's head starts crowning (station +3), you may not have time to record the O mark on the partograph!

Table 4.1 Corresponding positions of the station of the fetal head (determined by vaginal examination) and the record of fetal descent on the partograph.

Station of fetal head (Figure 4.3)	Corresponding mark on the partograph
–4 or –3	5
–2 or –1	4
0	3
+1	2
+2	1
+3	0

- What does crowning mean and what does it tell you?
- **Crowning** means that the presenting part of the baby's head remains visible between contractions; this indicates that the cervix is fully dilated.

4.6 Assessing moulding and caput formation

The five separate bones of the fetal skull are joined together by sutures, which are quite flexible during the birth, and there are also two larger soft areas called fontanels (Figure 4.4). Movement in the sutures and fontanels allows the skull bones to overlap each other to some extent as the head is forced down the birth canal by the contractions of the uterus. The extent of overlapping of fetal skull bones is called **moulding**, and it can produce a pointed or flattened shape to the baby's head when it is born (Figure 4.5).

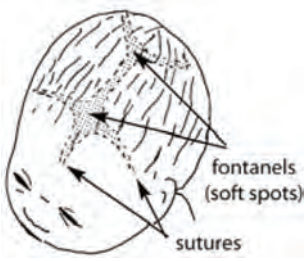


Figure 4.4 Sutures and fontanels in the newborn's skull.

Figure 4.5 Normal variations in moulding of the newborn skull, which usually disappears within 1–3 days after the birth.

A swelling on one side of the newborn's head is a danger sign and should be referred urgently; blood or other fluid may be building up in the baby's skull.

Some baby's skulls have a swelling called a **caput** in the area that was pressed against the cervix during labour and delivery (Figure 4.6); this is common even in a labour that is progressing normally. Whenever you detect moulding or caput formation in the fetal skull as the baby is moving down the birth canal, you have to be more careful in evaluating the mother for possible disproportion between her pelvic opening and the size of the baby's head. Make sure that the pelvic opening is large enough for the baby to pass through. A small pelvis is common in women who were malnourished as children, and is a frequent cause of prolonged and obstructed labour.

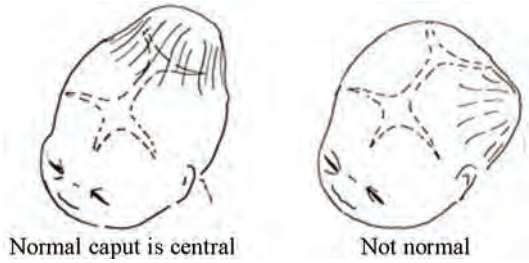


Figure 4.6 A caput (swelling) of the fetal skull is normal if it develops centrally, but not if it is displaced to one side.

4.6.1 Recording moulding on the partograph

To identify moulding, first palpate the suture lines on the fetal head (look back at Figure 1.4 in the first study session of this Module) and appreciate whether the following conditions apply. The skull bones that are most likely to overlap are the parietal bones, which are joined by the sagittal suture, and have the anterior and posterior fontanels to the front and back.

- **Sutures apposed:** This is when adjacent skull bones are touching each other, but are not overlapping. This is called degree 1 moulding (+1).
- **Sutures overlapped but reducible:** This is when you feel that one skull bone is overlapping another, but when you gently push the overlapped bone it goes back easily. This is called degree 2 moulding (+2).
- **Sutures overlapped and not reducible**: This is when you feel that one skull bone is overlapping another, but when you try to push the overlapped bone, it does not go back. This is called degree 3 moulding (+3). If you find +3 moulding with poor progress of labour, this may indicate that the labour is at increased risk of becoming obstructed.

You need to refer the mother urgently to a health facility if you identify signs of an obstructed labour. You will learn more about this in Study Session 9

When you document the degree of moulding on the partograph, use a scale from 0 (no moulding) to +3, and write them in the row of boxes provided:

0 Bones are separated and the sutures can be felt easily.

+1 Bones are just touching each other.

+2 Bones are overlapping but can be separated easily with pressure by your finger.

+3 Bones are overlapping but cannot be separated easily with pressure by your finger.

In the partograph, there is no specific space to document caput formation. However, caput detection should be part of your assessment during each vaginal examination. Like moulding, you grade the degree of caput as 0, +1, +2 or +3. Because of its subjective nature, grading the caput as +1 or +3 simply indicates a 'small' and a 'large' caput respectively. You can document the degree of caput either on the back of the partograph, or on the mother's health record (if you have it).

■ Imagine that you are assessing the degree of moulding of a fetal skull. What finding would make you refer the woman in labour most urgently, and why?

□ If you found +3 moulding and the labour was progressing poorly, it may mean there is uterine obstruction.

4.7 Uterine contractions

You already know that good uterine contractions are necessary for good progress of labour (Study Session 2). Normally, contractions become more frequent and last longer as labour progresses. Contractions are recorded every 30 minutes on the partograph in their own section, which is below the hour/time rows. At the left hand side is written 'Contractions per 10 mins' and the scale is numbered from 1–5. Each square represents one contraction, so that if two contractions are felt in 10 minutes, you should shade two squares.

On each shaded square, you will also indicate the *duration* of each contraction by using the symbols shown in Figure 4.7.

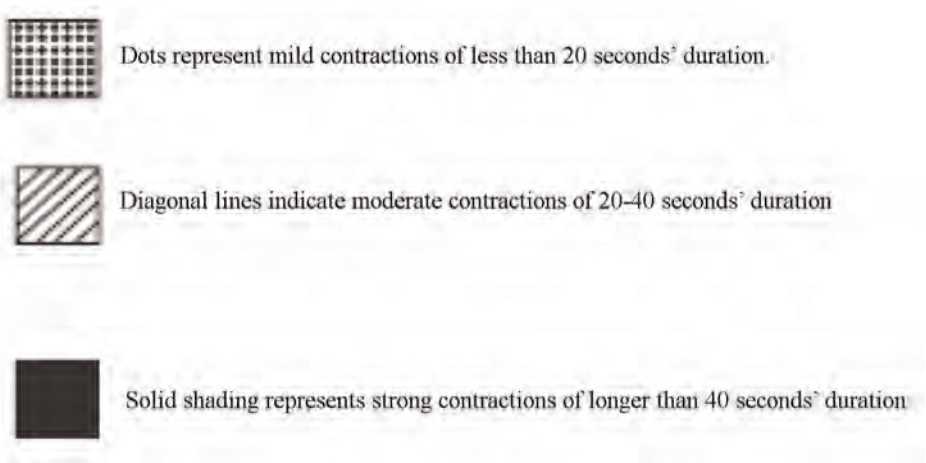


Figure 4.7 Different shading on the squares you draw on the partograph indicates the strength and duration of contractions.

4.8 Assessment and recording of fetal wellbeing

How do you know that the fetus is in good health during labour and delivery? The methods open to you are limited, but you can assess fetal condition:

- By counting the fetal heart beat every 30 minutes;
- If the fetal membranes have ruptured, by checking the colour of the amniotic fluid.

4.8.1 Fetal heart rate as an indicator of fetal distress

The normal fetal heart rate at term (37 weeks and more) is in the range of 120–160 beats/minute. If the fetal heart rate counted at any time in labour is either *below* 120 beats/minute or *above* 160 beats/minute, it is a warning for you to count it more frequently until it has stabilized within the normal range. It is common for the fetal heart rate to be a bit out of the normal range for a short while and then return to normal. However, **fetal distress** during labour and delivery can be expressed as:

- Fetal heart beat persistently (for 10 minutes or more) remains *below* 120 beats/minute (doctors call this *persistent fetal bradycardia*).
- Fetal heart beat persistently (for 10 minutes or more) remains *above* 160 beats/minute (doctors call this *persistent fetal tachycardia*).

4.8.2 Causes of fetal distress

There are many factors that can affect fetal wellbeing during labour and delivery. You learned in the *Antenatal Care* Module (Study Session 5) that the fetus is dependent on good functioning of the placenta and good supply of nutrients and oxygen from the maternal blood circulation. Whenever there is inadequacy in maternal supply or placental function, the fetus will be at risk of asphyxia, which is going to be manifested by the fetal heart beat deviating from the normal range. Other factors that will affect fetal wellbeing, which may be indicated by abnormal fetal heart rate, are shown in Box 4.1.

Box 4.1 Reasons for fetal heart rate deviating from the normal range

Placental blood flow to the fetus is compromised, which commonly occurs when there is:

- Hypertensive disorder of pregnancy
- Maternal anaemia
- Decreased maternal blood volume (hypovolemia) due to blood loss, or body fluid loss through vomiting and diarrhoea
- Maternal hypoxia (shortage of oxygen) due to maternal heart or lung disease, or living in a very high altitude
- A placenta which is 'aged'
- Amniotic fluid becomes scanty, which prevents the fetus from moving easily; the umbilical cord may become compressed against the uterine wall by the baby's body
- Umbilical cord is compressed because of prolapsed (coming down the birth canal ahead of the fetus), or is entangled around the baby's neck
- Placenta prematurely separates from the uterine wall (*placental abruption*).

You learned about hypertensive disorders of pregnancy, maternal anaemia and placental abruption in Study Sessions 18, 19 and 21 of the *Antenatal Care* Module, Part 2.

With that background in mind, counting the fetal heart beat every 30 minutes and recording it on the partograph, may help you to detect the first sign of any deviation for the normal range. Once you detect any fetal heart rate abnormality, you shouldn't wait for another 30 minutes; count it as frequently as possible and arrange referral quickly if persists for more than 10 minutes.

4.8.3 Recording fetal heart rate on the partograph

The fetal heart rate is recorded at the top of the partograph every half hour in the first stage of labour (if every count is within the normal range), and every 5 minutes in the second stage. Count the fetal heart rate:

- As frequently as possible for about 10 minutes and decide what to do thereafter.
- Count every five minutes if the amniotic fluid (called *liquor* on the partograph) contains thick green or black meconium.
- Whenever the fetal membranes rupture, because occasionally there may be cord prolapse and compression, or placental abruption as the amniotic fluid gushes out.

Each square for the fetal heart on the partograph represents 30 minutes. When the fetal heart rate is in the normal range and the amniotic fluid is clear or only lightly blood-stained, you can record the results on the partograph, as in the example in Figure 4.8 (on the next page). When you count the fetal heart rate at less than 30 minute intervals, use the back of the partograph to record each measurement. Prepare a column for the time and fetal heart rate.

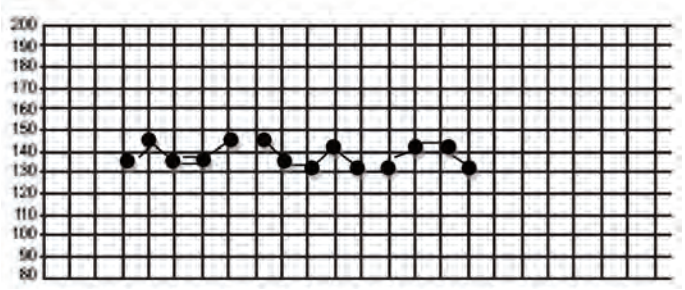


Figure 4.8 Example of normal fetal heart rate recorded on the partograph at 30 minute intervals.

4.8.4 Amniotic fluid as an indicator of fetal distress

Another indicator of fetal distress which has already been mentioned is meconium-stained amniotic fluid (greenish or blackish liquor). Lightly stained amniotic fluid may not necessarily indicate fetal distress, unless it is accompanied by persistent fetal heart rate deviations outside the normal range. The following observations are made at each vaginal examination and recorded on the partograph, immediately below the fetal heart rate recordings.

If the fetal membranes are intact, write the letter 'I' (for 'intact').

If the membranes are ruptured and:

- liquor is absent, write 'A' (for 'absent')
- liquor is clear, write 'C' (for 'clear')
- liquor is blood-stained, record 'B'
- liquor is meconium-stained, record 'M_1' for lightly stained, 'M_2' for a little bit thick and 'M_3' for very thick liquor which is like soup (see Box 4.2).

Box 4.2 Extent of meconium staining

Refer the woman in labour to a higher health facility as early as possible if you see:

- M_1 liquor in latent first stage of labour, even with normal fetal heart rate.
- M_2 liquor in early active first stage of labour, even with normal fetal heart rate.
- M_3 liquor in any stage of labour, unless progressing fast.

4.9 Assessment of maternal wellbeing

During labour and delivery, after your thorough initial evaluation, maternal wellbeing is followed by measuring the mother's vital signs: blood pressure, pulse, temperature, and urine output. *Blood pressure* is measured every four hours. *Pulse* is recorded every 30 minutes. *Temperature* is recorded every 2 hours. *Urine output* is recorded every time urine is passed. If you identify persistent deviations from the normal range of any of these measurements, refer the mother to a higher health facility.

Summary of Study Session 4

In Study Session 4, you have learned that:

1 The partograph is a valuable tool to help you detect abnormal progress of labour, fetal distress and signs that the mother is in difficulty.

2 The partograph is designed for recording maternal identification, fetal heart rate, colour of the amniotic fluid, moulding of the fetal skull, cervical dilatation, fetal descent, uterine contractions, whether oxytocin was administered or intravenous fluids were given, maternal vital signs and urine output.

3 Start recording on the partograph when the labour is in active first stage (4 cm or above).

4 Cervical dilatation, descent of the fetal head and uterine contractions are used in assessing the progress of labour. About 1 cm/hour cervical dilatation and 1 cm descent in four hours indicate good progress in the active first stage.

5 Fetal heart rate and uterine contractions are recorded every 30 minutes if they are in the normal range. Assess cervical dilatation, fetal descent, the colour of amniotic fluid (if fetal membranes have ruptured), and the degree of moulding or caput every four hours.

6 Do a digital vaginal examination immediately if the membranes rupture and a gush of amniotic fluid comes out while the woman is in any stage of labour.

7 Refer the woman to health centre or hospital if the cervical dilatation mark crosses the Alert line on the partograph.

8 When you identify +3 moulding of the fetal skull with poor progress of labour, this indicates labour obstruction, so refer the mother urgently.

9 Fetal heart rate below 120/min or above 160/min for more than 10 minutes is an urgent indication to refer the mother, unless the labour is progressing too fast.

10 Even with a normal fetal heart rate, refer if you see amniotic fluid (liquor) lightly stained with meconium in latent first stage of labour, or moderately stained in early active first stage of labour, or thick amniotic fluid in all stages of labour, unless the labour is progressing too fast.

Self-Assessment Questions (SAQs) for Study Session 4

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the following questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 4.1 (tests Learning Outcomes 4.1, 4.2 and 4.3)

Read Case Study 4.1 and then answer the questions that follow it.

Case Study 4.1 Bekelech's story

Bekelech is a gravida 5, para 4 mother, whose current pregnancy has reached the gestational age of 40 weeks and 4 days. When you arrive at her house, she is already in labour. During your first assessment, she had four contractions in 10 minutes, each lasting 35–40 seconds. On vaginal examination, the fetal head was at –3 station and Bekelech's cervix was dilated to 5 cm. The fetal heart rate at the first count was 144 beats/min.

(a) What does it mean to say that Bekelech is a 'gravida 5, para 4 mother'?
(b) How would you describe the gestational age of Bekelech's baby?
(c) Which stage of labour has she reached and is the baby's head engaged yet?
(d) Is the fetal heart rate normal or abnormal?
(e) What would you do to monitor the progress of Bekelech's labour?
(f) How often would you do a vaginal examination in Bekelech's case and why?

SAQ 4.2 (tests Learning Outcome 4.2)

Give two reasons for using a partograph.

SAQ 4.3 (tests Learning Outcomes 4.1, 4.3, 4.4 and 4.5)

(a) What indicators of good progress of labour would you record on the partograph?
(b) What indicators of fetal wellbeing would you record on the partograph?
(c) How often should you measure the vital signs of the mother and record them on the partograph in a normally progressing labour?
(d) What are the key indicators for immediate referral?

Study Session 5 Conducting a Normal Delivery

Introduction

In the previous study sessions of this Module, you were introduced to the definition, signs, symptoms and stages of labour and the use of the partograph. You also learned about care of the woman in labour. In this session, you will learn how to assist the woman in the second stage of a normal labour and how to deliver the baby. The second stage is the part of labour when the mother pushes the baby out of the uterus and down the vagina, and the baby is born. **Second stage** begins when the cervix is completely dilated and ends when the baby is delivered.

During the second stage, the mother's passive control during the long hours of the first stage of labour is replaced by intense physical effort and exertion for a comparatively short period. The mother and her support person require stamina, courage and confidence from the birth attendant. A healthy outcome for the mother and her baby depends upon your competence in providing quality care and the successful partnership between you and the mother.

Learning Outcomes for Study Session 5

When you have studied this session you should be able to:

5.1 Define and use correctly all of the key words printed in **bold**. (SAQs 5.1, 5.2 and 5.3)

5.2 Describe the signs of second stage labour and explain what is happening to the mother and the baby as it moves down the birth canal. (SAQs 5.1 and 5.2)

5.3 Describe how you would assess if the second stage is progressing normally and identify the warning signs that sufficient progress is not being made. (SAQs 5.1 and 5.2)

5.4 Describe how you would conduct the normal delivery of a healthy baby and give it immediate newborn care. (SAQs 5.3 and 5.4)

5.5 Explain how you would support bonding between mother and newborn after the delivery. (SAQ 5.5)

5.1 Recognising the signs of second stage labour

The only positive sign in diagnosing second stage of labour is full dilatation of the cervix. The only way you can be certain the cervix is dilated all the way is to do a vaginal examination. But remember: repeated vaginal exams can cause infection. It is better not to do a vaginal exam frequently (less than 4 hours interval) unless:

- When you count the fetal heart beat it is outside the normal range (outside 120–160 beats per minute).
- There is a sudden gush of amniotic fluid, which may indicate that there is a risk for cord prolapse or placental abruption.
- You detect signs of second stage of labour beginning before the next scheduled vaginal examination. (See Box 5.1 for signs of second stage.)

With experience, you can usually tell when the mother is ready to push without doing a vaginal exam.

Box 5.1 Signs of second stage

If the mother has two or more of these signs, she is probably in second stage of labour:

- She feels an uncontrollable urge to push (she may say she needs to pass stool)
- She may hold her breath or grunt during contractions
- She starts to sweat
- Her mood changes — she may become sleepy or more focused
- Her external genitals or anus begin to bulge out during contractions
- She feels the baby's head begin to move into the vagina
- A purple line appears between the mother's buttocks as they spread apart from the pressure of the baby's head.

5.1.1 What happens during second stage of labour?

During second stage, when the baby is high in the vagina, you can see the mother's genitals bulge during contractions. Her anus may open a little. Between contractions, her genitals relax (Figure 5.1).

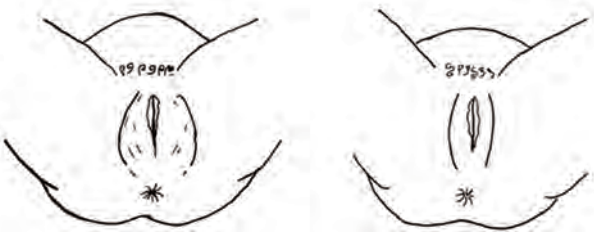


Figure 5.1 Genitals relax between contractions.

Each contraction (and each push from the mother) moves the baby further down. Between contractions, the mother's uterus relaxes and pulls the baby back up a little (but not as far as it was before the contraction).

After a while, you can see a little of the baby's head coming down the vagina during contractions. The baby moves like an ocean tide: in and out, in and out, but each time closer to birth (Figures 5.2a–d).

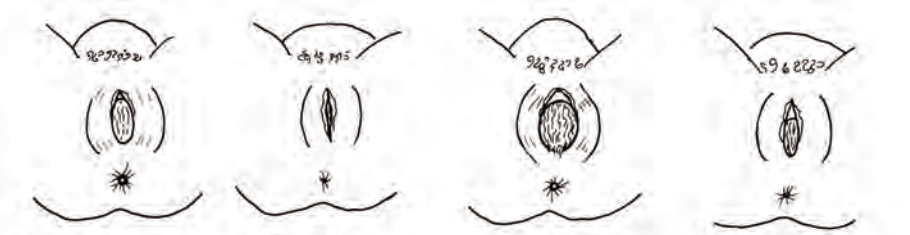


Figure 5.2(a) During a contraction, the baby's head shows.

Figure 5.2(b) Between contractions the baby's head goes back inside the vagina.

Figure 5.2(c) A little more of the baby's head shows with each contraction.

Figure 5.2(d) The head slips back but not as far as before.

When the baby's head stretches the vaginal opening to about the size of the palm of your hand (Figure 5.3), the head will stay at the opening - even between contractions. This is called **crowning**. Once the head is born, the rest of the body usually slips out easily with one or two pushes.

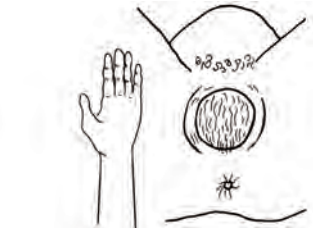


Figure 5.3 The fetal head stretches the vaginal opening to the size of the palm of your hand.

5.1.2 How does the baby move through the birth canal?

Figure 5.4 shows the movement of the baby through the birth canal. Babies move this way if they are positioned head-first, with their backs toward their mother's bellies. But many babies do not face this way. A baby who faces the mother's front, or who is breech, moves in a different way. Watch each birth closely to see how babies in different positions move.

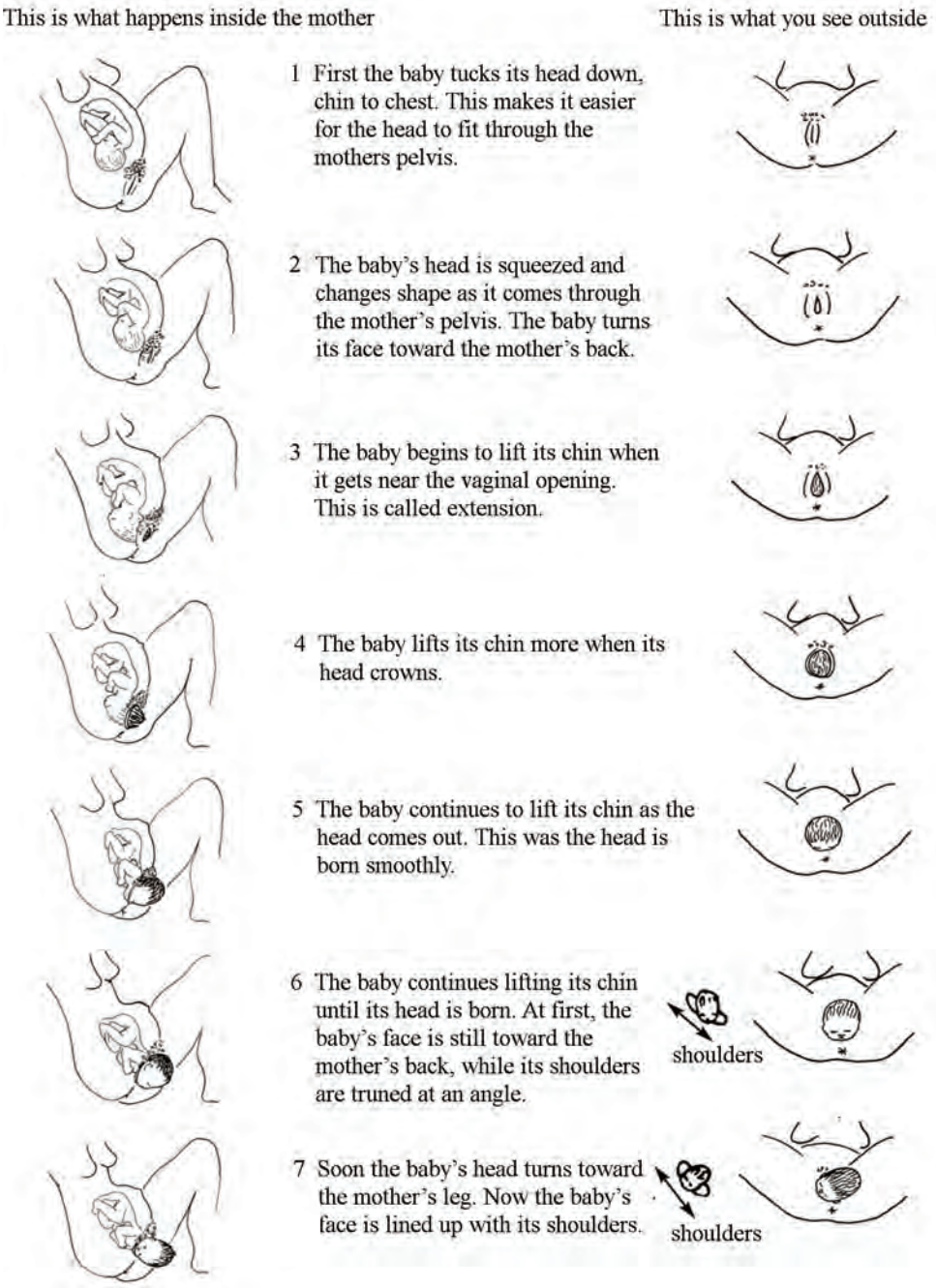


Figure 5.4 The seven cardinal movements of the baby during labour and delivery.

5.2 Help the mother and baby have a safe birth

Continue to check the mother's vital signs as you have been doing during the first stage of labour.

Figure 5.5 Checking the fetal heartbeat during the second stage of labour.

5.2.1 Check the baby's heart beat

The baby's heartbeat is harder to hear in second stage because the heart is usually lower in the mother's belly. If you are experienced, you may be able to hear the baby's heart between contractions. You can hear it best very low in the mother's belly, near the pubic bone (Figure 5.5). It is OK for the heartbeat to be as slow as 100 beats a minute during a pushing contraction. But it should come right back up to the normal rate as soon as the contraction is over.

- What is the normal fetal heatbeat?
- Between 120 and 160 beats per minute.

If the baby's heartbeat does not come back up within 1 minute, or stays slower than 100 beats a minute for more than a few minutes, the baby may be in trouble. Ask the mother to change position (to lie on her side), and check the baby's heartbeat again. If it is still slow, ask the mother to stop pushing for a few contractions. Make sure she takes deep, long breaths so that the baby will get adequate oxygen.

5.2.2 Support the mother's pushing

Figure 5.6 Gently encourage the mother to push when she feels the urge.

When the cervix is fully dilated, the mother's body will push the baby out. Some healthcare providers get very excited during the pushing stage. They yell at mothers, 'Push! Push!' but mothers do not usually need much help to push. Their bodies push naturally, and when they are encouraged and supported, women will usually find the way to push that feels right and gets the baby out.

If a mother has difficulty pushing, do not scold or threaten her. And never insult or hit a woman to make her push. Upsetting or frightening her can slow the birth. Instead, explain how to push well (Figure 5.6). Each contraction is a new chance. Praise her for trying.

Tell the mother when you see her outer genitals bulge. Explain that this means the baby is coming down. When you see the head, let the mother touch it. This may also help her to push better.

Let the mother choose the position that feels good to her. You already learned about different positions in first stage in Study Session 3. But note that it is not good for the mother to lie flat on her back during a normal birth. Lying flat can squeeze the blood vessels that bring blood to the baby and the mother, and can make the birth slower.

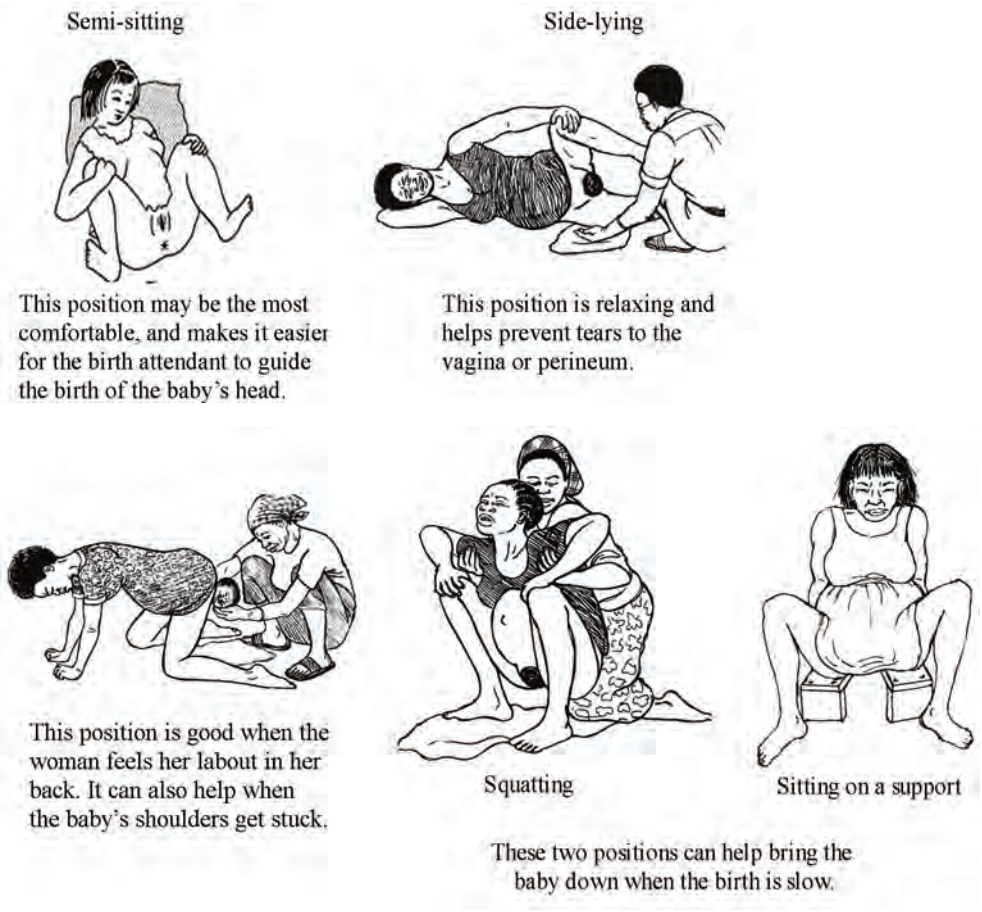


Figure 5.7 Different positions during second stage of labour.

5.2.3 Watch for warning signs

Watch the speed of each birth. If the birth is taking too long, take the woman to a hospital. This is one of the most important things you can do to prevent serious problems or even death of women in labour.

Do not apply fundal pressure to help push the baby out. Fundal pressure can cause the placenta to detach or the uterus to rupture.

First babies may take a full 2 hours of strong contractions and good pushing to be born. Second and later babies usually take less than 1 hour of pushing. Watch how fast the baby's head is moving down through the birth canal. As long as the baby continues to move down (even very slowly), and the baby's heartbeat is normal, and the mother has strength, then the birth is normal and healthy. The mother should continue to push until the head crowns.

But pushing for a long time with no progress can cause serious problems, including fistula, uterine rupture (you will learn about this in Study Session 10 of this Module), or even death of the baby or mother. If you do not see the mother's genitals bulging after 30 minutes of strong pushing, or if the mild bulging does not increase, the head may not be coming down. If the baby is not moving down at all after 1 hour of pushing, the mother needs help.

Therefore, refer immediately if the woman stayed (couldn't deliver) in the second stage for more than:

- 1 hour with no good progress (multigravida woman)
- 2 hours with no good progress (primigravida).

Good progress in the second stage is characterized by a marked change in level of station of the baby's head. If you have a woman in the second stage with little or no fetal descent, or you see any signs that the baby is developing

caput or excessive moulding of its skull, refer the woman to hospital or a health centre immediately.

5.3 Conducting delivery of the baby

Your skill and judgment are crucial factors in minimizing trauma for the mother and ensuring a safe delivery for the baby. These qualities are acquired through experience but certain basic principles must be applied whatever the expertise you have. These are:

- Observation of progress of the labour
- Prevention of infection
- Emotional and physical comfort of the mother
- Anticipation of normal events
- Recognition of abnormal labour or fetal distress.

5.3.1 Prevent tears in the vaginal opening

The birth of the baby's head may tear the mother's vaginal opening. But you can prevent tears by supporting the vagina during the birth. In some communities, circumcision of girls (also called female genital cutting) is common. This harmful traditional practice causes scars that may not stretch enough to let the baby out or the scar may tear as the baby is born.

5.3.2 Delivery of the head

Figure 5.8 Assisting the delivery of the baby's head.

Wash your hands well and put on sterile gloves and other protective materials.

Clean the perineal area using antispetic and (if you have them) put clean drapes (cloths) over the mother's thighs.

Press one hand firmly on the perineum (the skin between the opening of the vagina and the anus). This hand will keep the baby's chin close to its chest — making it easier for the head to come out (Figure 5.8). Use a piece of cloth or gauze to cover the mother's anus; some faeces (stool) may be pushed out with the baby's head.

Use your other hand to apply gentle downward pressure on the top of the baby's head to keep the baby's head flexed (bent downwards).

Once the head has crowned, the head is born by the extension of the face, which appears at the perineum.

Clear the baby's nose and mouth. When the head is born, and before the rest of the body comes out, you may need to help the baby breathe by clearing its mouth and nose. If the baby has some mucus or water in its nose or mouth, wipe it gently with a clean cloth wrapped around your finger.

5.3.3 Check if the cord is around the baby's neck

If there is a rest between the birth of the head and the birth of the shoulders, feel for the cord around the baby's neck.

- If the cord is wrapped loosely around the neck, loosen it so it can slip over the baby's head or shoulders.
- If the cord is very tight, or if it is wrapped around the neck more than once, try to loosen it and slip it over the head.

- If you cannot loosen the cord, and if the cord is preventing the baby from coming out, you may have to clamp and cut it.

If you can, use medical hemostats (clamps) and blunt-tipped scissors for clamping and cutting the cord in this situation. If you do not have them, use clean string and a new razor. Clamp or tie in two places and cut in between (Figure 5.9). Be very careful not to cut the mother or the baby's neck.

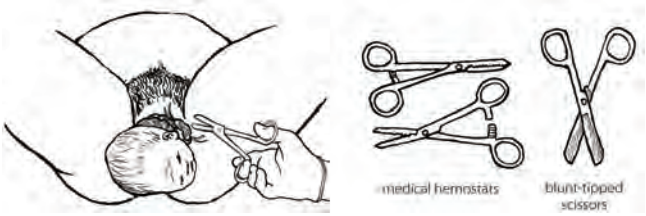


Figure 5.9 Cutting the cord when it is wrapped around the baby's neck.

If you cut the cord before the birth of the baby, the mother must push hard and get the baby out fast. Without the cord, the baby cannot get any oxygen until he or she begins to breathe.

5.3.4 Delivery of the shoulders

After the baby's head is born and he or she turns to face the mother's leg, wait for the next contraction. Ask the mother to give a gentle push as soon as she feels the contraction. Usually, the baby's shoulders will slip right out. To prevent tearing, try to bring out one shoulder at a time (Figure 5.10).

Figure 5.10 Delivery of the shoulders when the mother is in different birthing positions.

Do not bend the baby's head far. Guide the head — do not pull it.!

5.3.5 Delivery of the baby's body

After the shoulders are born, the rest of the body usually slides out without any trouble. Remember that new babies are wet and slippery. Be careful not to drop the baby!

Put the baby on the mother's abdomen, dry the baby with a clean cloth and then put a new, clean blanket over him or her to keep the baby warm. Be sure the top of the baby's head is covered with a hat or blanket. If everything seems OK, give the baby the chance to breastfeed right away. You do not have to wait until the placenta comes out or the cord is cut.

5.3.6 Cutting the cord

Most of the time, there is no need to hurry to cut the cord right away. Leaving the cord attached will help the baby to have enough iron in his or her blood, because some of the blood in the placenta drains along the cord and into the baby. It will also keep the baby on the mother's belly which is the best place to be right now. Wait until the cord stops pulsing and looks like it is mostly empty of blood.

BUT if the mother is known to be HIV-infected or her HIV status is not known, it is better to cut the cord soon after you have dried the baby and made sure that he or she is warm.

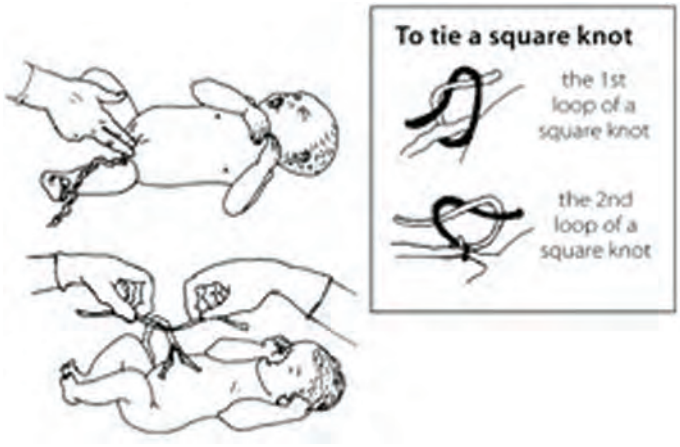


Figure 5.11 Cutting the umbilical cord.

Use a sterile string or sterile clamp to tightly tie or clamp the cord about two finger widths from the baby's belly. (The baby's risk of getting tetanus is greater when the cord is cut far from the body.) Tie a square knot (Figure 5.11).

Put another sterile string or clamp one finger from the first knot. And, if you do not have a clamp on the cord on the mother's side, add a third knot two fingers from the second knot. Putting a double knot on the cord reduces the risk of bleeding.

Cut *after* the second tie (e.g. the first tie is approximately 3 cm from the baby's abdomen and the second is approximately 5 cm). Cut after the 5 cm tie with a sterile razor blade or sterile scissors.

5.4 Immediate care of the newborn baby

Essential newborn care includes the following actions. But note that you will learn about resuscitation of the newborn who is not breathing adequately in Study Session 6.

5.4.1 Clean childbirth and cord care

Principles of cleanliness are essential in both home and health post childbirth to prevent infection to the mother and baby. These are:

- Clean your hands
- Clean the mother's perineum
- Nothing unclean introduced vaginally
- Clean delivery surface
- Cleanliness in cord clamping and cutting.

The stump of the umbilical cord must be kept clean and dry to prevent infection. Wash it with soap and clean water only if it is soiled. Remember:

- Do not apply dressings or substances of any kind
- If the cord bleeds, re-tie it.

It usually falls off 4–7 days after birth, but until this happens, place the cord outside the nappy to prevent contamination with urine/faeces.

Do not put dirt or dung on the cord stump! Dirt and dung do not protect the stump — they cause serious infections.

5.4.2 Check the newborn

Most babies are alert and strong when they are born. Other babies start slow, but as the first few minutes pass, they breathe and move better, get stronger, and become less blue. Immediately after delivery, clear airways and stimulate the baby while drying. To see how healthy the baby is, watch for:

- Breathing: babies should start to breathe normally within seconds after birth. Babies who cry after birth are usually breathing well. But many babies breathe well and do not cry at all.
- Colour: the baby's skin should be a normal colour – not pale or bluish.
- Muscle tone: the baby should move his or her arms and legs vigorously.

All of these things should be checked simultaneously within the first minute after birth. You will learn about this in detail in Study Session 6 of this Module.

5.4.3 Warmth and bonding

Newborn babies are at increased risk of getting extremely cold. The mother and the baby should be kept skin-to-skin contact, covered with a clean, dry blanket. This should be done immediately after the birth, even before you cut the cord.

The mother's body will keep the baby warm, and the smell of the mother's milk will encourage him or her to suck. Be gentle with a new baby. The first hour is the best time for the mother and baby to be together, and they should not be separated. This time together will also help to start breastfeeding as early as possible.

5.4.4 Early breastfeeding

Figure 5.12 Breast feeding is good for the mother and baby.

If everything is normal after the birth, the mother should breastfeed her baby right away (Figure 5.12). She may need some help getting started. The first milk to come from the breast is yellowish and is called **colostrum**. Some women think that colostrum is bad for the baby and do not breastfeed in the first day after the birth. But colostrum is very important! It is full of protein and helps to protect the baby from infections.

- Breastfeeding makes the uterus contract. This helps the placenta come out, and it may help prevent heavy bleeding.
- Breastfeeding helps the baby to clear fluid from his nose and mouth and breathe more easily.
- Breastfeeding is a good way for the mother and baby to begin to know each other.
- Breastfeeding comforts the baby.
- Breastfeeding can help the mother relax and feel good about her new baby.

If the baby does not seem able to breastfeed, see if it has a lot of mucus in his or her nose. To help the mucus drain, lay the baby across the mother's chest with its head lower than its body. Stroke the baby's back from the waist up to the shoulders. After draining the mucus, help the mother to put the baby to the breast again. You will learn a lot more about breastfeeding in the next Module in this curriculum on *Postnatal Care*.

Summary of Study Session 5

In Study Session 5 you learned that:

1 The second stage of labour begins when the cervix is completely dilated and ends when the baby is delivered. Close attention, skilled care and prompt action are needed from you for a safe clean birth.

2 The signs of second stage are when the mother feels an uncontrollable urge to push, she holds her breath or grunts during contractions, she starts to sweat, her mood changes, her external genitals or anus begin to bulge out during contractions, she feels the baby's head begin to move into the vagina, a purple line appears between her buttocks.

3 Check the mother's vital signs, the fetal heart beat and the descent of the baby's head at intervals to ensure that labour is progressing normally.

4 Watch for warning signs that labour is not progressing sufficiently during the second stage and take appropriate action to refer the mother.

5 Support the mother's pushing during the time of actual delivery.

6 If the cord is trapped around the baby's neck, cut it before the body is delivered — but make sure the mother pushes hard to get the baby out fast.

7 Maintain cleanliness throughout the entire process of labour and delivery to prevent infection to the mother and baby.

8 Keep the newborn baby warm and make sure it is breathing well.

9 Initiate early breast feeding.

Self-Assessment Questions (SAQs) for Study Session 5

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the questions below Case Study 3.1. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 5.1 (tests Learning Outcomes 5.1, 5.2 and 5.3)

Which of the following statements is *false*? In each case, explain what is incorrect.

A Full dilatation of the cervix to 10 cm is the most important sign that the second stage of labour is beginning.

B In second stage, the mother's genitals tend to bulge during contractions and relax between contractions.

C Crowning is the name given to the moment when the baby's head is completely born.

D In a normal delivery, the baby moves down the birth canal facing the front of the mother's body, with its back towards her backbone.

E While it is still in the birth canal, the baby's heartbeat tends to get faster during a contraction.

F Let the mother choose the position that she feels most comfortable in when she gets the urge to push in the second stage of labour.

SAQ 5.2 (tests Learning Outcome 5.3)

List four warning signs that second stage labour may not be progressing normally.

SAQ 5.3 (tests Learning Outcome 5.4)

Imagine that the baby's head has been born and you are waiting for the next contraction to deliver the baby's shoulders. What should you do if you find that the umbilical cord is wrapped around the baby's neck?

SAQ 5.4 (tests Learning Outcomes 5.4 and 5.5)

Rearrange the following actions into the correct order during delivery of the baby and immediately afterwards. (J and K are on the next page.)

A Once the baby's head is born, help it to breathe by clearing its nose and mouth.

B Wash your hands well and put on sterile gloves and other protective clothing.

C To prevent tearing of the mother's birth vagina or perineum, deliver the baby's shoulders one at a time.

D Press one hand firmly over the mother's perineum.

E When the baby has been completely delivered, put it on the mother's abdomen and dry it with a clean cloth.

F Clean the mother's perineal area with antiseptic.

G Clamp or tie the cord in two places and cut it in between the clamps.

H Use your other hand to apply gentle downward pressure on the top of the baby's head to keep it flexed (bent downwards).

I Cover the baby to keep it warm and give it a chance to breastfeed straight away.

J Use a piece of cloth or gauze to cover the mother's anus in case any faeces come out with the baby.
K Check that the cord is not around the baby's neck.

SAQ 5.5 (tests Learning Outcome 5.5)

What do you do to help bonding between the mother and her newborn baby?

Study Session 6 Active Management of the Third Stage of Labour

Introduction

In the final study session of this Module, you will learn about postpartum haemorrhage (PPH), which is a leading cause of maternal mortality, responsible for about a quarter of all maternal deaths. Worldwide, around 127,000 women every year die of postpartum haemorrhage. The majority of these fatal cases of excessive bleeding occur in the first 24 hours after delivery of the baby, as a result of complications arising during the third stage of labour. To minimize the risks of PPH in this critical stage of labour, a set of procedures have been developed that all birth attendants should follow, called active management of third stage of labour (AMTSL). Correctly applied, AMSTL can reduce the risk of postpartum haemorrhage by more than 60%.

In this study session, you will learn what is meant by AMTSL and the procedures you will conduct during each of its six steps. This knowledge will help you to identify the complications that may arise during the third stage of labour and manage them more effectively.

Learning Outcomes for Study Session 6

When you have studied this session, you should be able to:

6.1 Define and use correctly all of the key words printed in **bold**. (SAQ 6.1)

6.2 Explain the natural physiological process of placental delivery. (SAQ 6.1)

6.3 Describe the six steps of active management of third stage of labour (AMTSL). (SAQ 6.2)

6.4 Summarise the regimens for each of the uterotonic drugs used in AMTSL. (SAQs 6.2 and 6.3)

6.5 Explain how you would examine the placenta and membranes for completeness. (SAQ 6.3)

6.6 Describe the warning signs for complications that may arise during the third stage of labour. (SAQ 6.4)

6.1 The third stage of labour

The **third stage of labour** begins with the birth of the baby and ends with the delivery of the placenta and fetal membranes. Normally, it should last less than 30 minutes.

6.1.1 Natural processes during the third stage

In a complication-free labour, the third stage is when natural physiological processes spontaneously deliver the placenta and fetal membranes. For this to happen unproblematically, the cervix must remain open and there needs to be good uterine contraction. In the majority of cases, the processes occur in the following order:

1 *Separation of the placenta:* The placenta separates from the wall of uterus (see Figure 6.1a and b). As it detaches, blood from the tiny vessels in the placental bed begins to clot between the placenta and the muscular wall of the uterus (the **myometrium**).

2 *Descent of the placenta:* After separation, the placenta moves down the birth canal and through the dilated cervix (see Figure 6.1c).

3 *Expulsion of the placenta:* The placenta is completely expelled from the birth canal (see Figure 6.1d).

This expulsion marks the end of the third stage of labour. Thereafter, the muscles of the uterus continue to contract powerfully and thus compress the torn blood vessels. This, (together with blood clotting) quickly reduces and stops the postpartum bleeding.

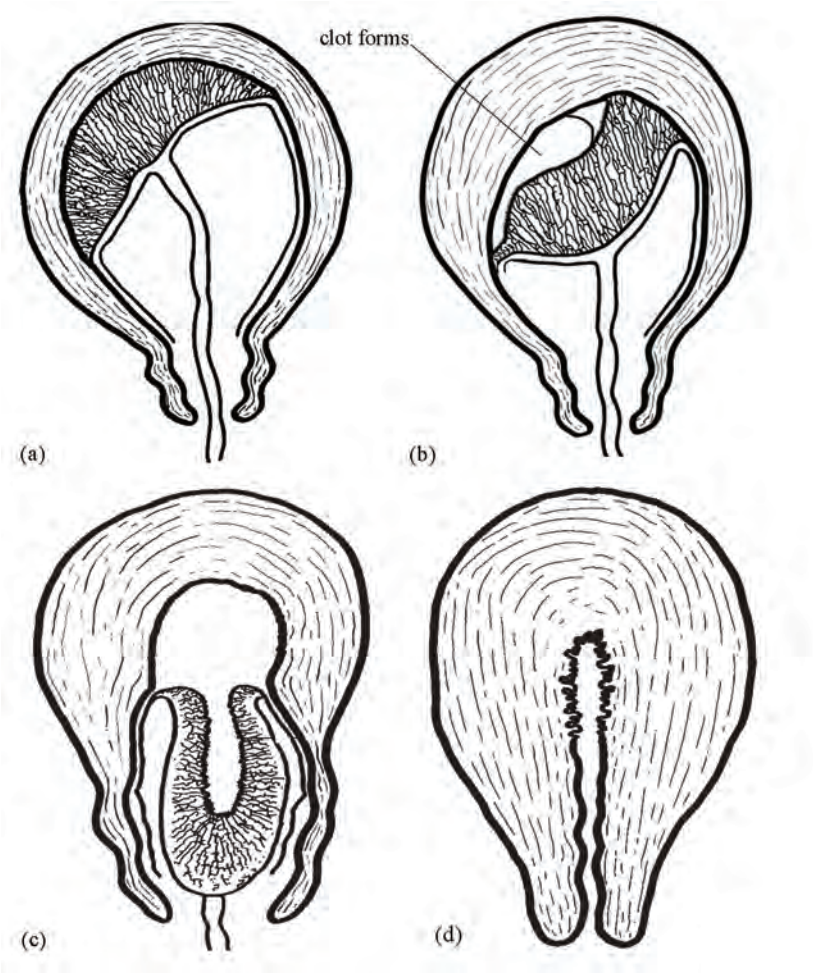


Figure 6.1 (a) Placenta not separated at the beginning of third stage. (b) Placenta begins separating and a blood clot forms behind it. (c) Placenta descending through the cervix. (d) Placenta completely expelled marks the end of third stage; the uterus contracts powerfully. (Source: WHO, 2008, *Midwifery Education Manual: Managing Postpartum Haemorrhage*, Figures 1.5 to 1.7, pages 22-23)

Study Session 11 of this Module will tell you in detail about postpartum haemorrhage and atonic uterus; the other terms in Box 6.1 are covered in this study session.

6.1.2 Complications occurring during the third stage of labour

Women who give birth unattended by a skilled healthcare provider (like you) are more likely to experience complications at all stages of labour, including the third stage. These complications are listed in Box 6.1 below. They can

arise even in a delivery where the placenta was implanted in a good position in the top two-thirds of the uterus, labour was not prolonged and the birth was normal. In such cases, while a normal and spontaneous delivery of the placenta during the third stage might be expected, complications can still arise unpredictably. You should always be prepared for the unexpected emergency.

Box 6.1 Common complications of third stage of labour

All these complications are much more likely to occur if the third stage is not properly managed, using the AMTSL approach.

Retained placenta

The placenta remains inside the uterus for longer than 30 minutes after delivery of the baby, usually due to one or more of the following:

- Uterine contractions may be inadequate to expel the placenta
- The cervix might have retracted too fast and partially closed, trapping the placenta in the uterus
- The bladder may be full and obstructing placental delivery.

Excessive bleeding (PPH)

PPH is the loss of more than 500 ml of blood following delivery of the baby. Most bleeding comes from where the placenta was attached to the uterus, and is bright or dark blood and usually thick. PPH occurs when the uterus fails to contract well, usually due to:

- Partially separated placenta (it remains partly attached to the uterine wall
- Completely separated placenta, but retained inside the uterus
- **Atonic uterus**; the muscular wall of the uterus could not contract powerfully enough to arrest the natural bleeding which occurs when the placenta separates.

Uterine inversion

The uterus is pulled 'inside out' as the baby or the placenta is delivered, and partly emerges through the vagina.

6.2 Active management of third stage of labour (AMTSL)

A birth attendant applying **active management of third stage of labour (AMTSL)** is the key to reducing the risk of the complications set out in Box 6.1. The term 'active management' indicates that you are not waiting for spontaneous placental delivery. Rather, you will intervene in a carefully programmed sequential manner, as follows:

- As soon as the baby is delivered, put it on the mother's abdomen in skin-to-skin contact with her. Cover them with a blanket.
- Clamp the baby's umbilical cord at two sites and cut it in between, as you learned to do in Study Session 5.

- Then follow the steps in Box 6.2. We describe each of them in detail in the next section.

Box 6.2 The six steps of AMTSL in sequence

1 Check the uterus for the presence of a second baby.
2 In less than one minute, administer a **uterotonic drug** (a hormone-like chemical that makes the uterus contract more powerfully).
3 Apply controlled cord traction.
4 After delivery of the placenta, immediately start massaging the uterus.
5 Examine the placenta to make sure it is complete and none of it has been retained in the uterus.
6 Examine the woman's vagina, perineum and external genitalia for lacerations and active bleeding.

Step 1 Check the uterus – is there a second baby?

Immediately after the birth of the baby, check for the presence of a second baby by palpating the uterus through the mother's abdomen. When you feel *certain* that the uterus does not contain a second baby, and you can feel that it has reduced in size to no larger than at 24 weeks of gestation, go to step 2. The reason for checking so carefully is because the drug you will administer to the mother in step 2 will make the uterus contract so powerfully that it will damage a baby that remains inside it. If you find that there is a twin, give the the uterotonic drug *after* the birth of the second baby.

Step 2 Administer a uterotonic drug to help the uterus contract

The commonly used uterotonic drugs in obstetric practice are:

- misoprostol (tablets)
- oxytocin (injectable)
- ergometrine (injectable).

These drugs help the uterus to continue contracting strongly and rhythmically after the baby is born: they facilitate placental delivery and help to prevent excessive bleeding from a relaxed (atonic) uterus. Although there are three possible drugs, for deliveries in low-resource settings, such as homes in rural areas of Ethiopia, on many occasions misoprostol may be the only one of these drugs that you will be able to use. Oxytocin is the drug recommended by the World Health Organization (WHO), but it may not be practical for the following reason:

Health Posts are supplied with a refrigerator and mobile icebox for transport of vaccines to outreach events, as described in the *Immunization* Module.

Oxytocin and ergometrine always have to be kept refrigerated at 2–8°C, so they are not suitable for a home delivery unless the household has a refrigerator, or you have a mobile icebox. They also have to be protected from exposure to light.

Dosages of uterotonic drugs

In less than one minute after the delivery of the baby, and after clamping and cutting the umbilical cord, give the mother *one* of the following:

- *misoprostol* 600 micrograms (µg), i.e. three 200 µg tablets by mouth with a drink of water.

  OR (if you carry this in an icebox)

- *oxytocin* 10 international units (IU) injected deep into the woman's thigh muscles (intramuscular injection, IM).

  OR

- *ergometrine* 0.4–0.5 milligrams (mg) injected deep into the woman's thigh muscles (intramuscular injection, IM).

Note that ergometrine is not recommended for use by rural Health Extension Practitioners.

When the uterus is well contracted it will feel very hard. This should occur between 2–7 minutes after the administration of the drug, depending on which one is given.

Advantages and disadvantages of the uterotonic drugs

Misoprostol is less effective than oxytocin and has more side-effects. However, in many rural situations you will have no other option but to use it because of the need to store oxytocin in a refrigerator or icebox. It will be important therefore to advise the mother that while it will be effective in preventing bleeding, she may also experience some side-effects. This applies whichever uterotonic drug you are giving, but especially in the case of misoprostol, which causes side-effects in a significant proportion of women. They are:

- Shivering: this may start 1 hour after taking misoprostol and will subside after 2–6 hours. Ask the family to offer the mother warm tea or 'atmit', as well as blankets.
- Fever: this is rarer, but may start after the shivering. It is not necessarily a sign of infection and it will disappear within 2–8 hours after taking the drug.
- Diarrhoea: may also occur and normally lasts less than a day.
- Nausea and vomiting: can also occur, but will subside 2–6 hours afterwards.

■ What is the great advantage that misoprotol has compared to the other uterotonic drugs?

□ It comes in tablet form, so injection equipment (syringes, needles) are not required, and it does not need to be stored in a refrigerator so it can be used where there is no way of keeping drugs very cold.

Oxytocin is the recommended uterotonic drug in all situations where it is feasible to use it, because it is more effective than the other drugs and has fewer side-effects. Oxytocin is a naturally occurring hormone in the woman's body, which is involved in the onset and progression of uterine contractions during labour. Manufactured oxytocin is given after the delivery to ensure that the uterus goes on contracting rhythmically, like natural uterine contractions. However, it does not have a sustained action (the effect subsides quite quickly) and it must be stored in a refrigerator and protected from light.

Ergometrine is less widely used because it is such a strong uterotonic drug that it may hasten the closure of the cervix before the delivery of the placenta.

It is not planned to use ergometrine in the rural Health Extension Service. It must *never* be given to a woman with pre-eclampsia, eclampsia or high blood pressure, because it causes the blood vessels to constrict, forcing her blood pressure even higher.

It takes longer to act than oxytocin (6–7 minutes when given intramuscularly) and it causes marked spasm of the uterus by a series of rapid sustained contractions, which are unlike the natural uterine contractions. However, it is long-lasting, with an effect over approximately 2–4 hours.

Step 3 Apply controlled cord traction with counter-pressure

When the uterus is well contracted it will feel very hard. This should occur 2–3 minutes after the administration of one of the uterotonic drugs. Then **controlled cord traction with counter pressure** is used to help to expel the placenta (see Figure 6.2 and Box 6.3).

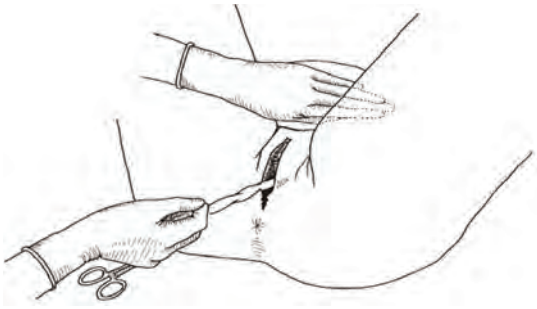


Figure 6.2 Controlled cord traction. The right hand is pulling the clamped umbilical cord (*making traction*) while the left hand is exerting *counter-pressure* on the lower abdomen, just above the pubic bone. (Source: WHO, 2008, *Midwifery Education Manual: Managing Postpartum Haemorrhage*, Figure 1.18, page 33)

To avoid *inversion* of the uterus (turning inside out and coming out of the vagina), controlled cord traction should NEVER be applied without counter-pressure to the abdomen.

Box 6.3 How to do controlled cord traction with counter-pressure

1. Clamp the umbilical cord close to the perineum (once pulsation of the blood vessels stops in the cord of a healthy newborn) and hold the cord in one hand.
2. Place the other hand just above the woman's pubic bone and stabilize the uterus by applying *counter-pressure* to the abdomen during controlled cord traction.
3. Keep slight tension on the cord and await a strong uterine contraction (usually every 2–3 minutes).
4. With the strong uterine contraction, encourage the mother to push and very gently pull downward on the cord to deliver the placenta. Continue to apply counter-pressure to the uterus.
5. Between contractions, gently hold the cord and wait until the uterus is well contracted again.
6. With the next contraction, repeat controlled cord traction with counter-pressure.
7. If the placenta does not descend during 30–40 seconds of controlled cord traction *do not* continue to pull on the cord.

The following actions complete the rest of the delivery of the placenta.

As the placenta is delivered, it should be caught in both hands at the vulva to prevent the membranes tearing and some being left behind. Hold the placenta

in two hands and gently turn it until the membranes are twisted (see Figure 6.3). Slowly pull to complete the delivery of the placenta.

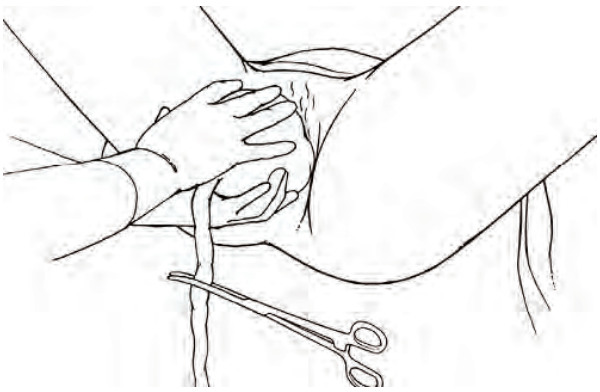


Figure 6.3 Delivery of the placenta.

Delivery of the placenta marks the end of the third stage of labour. At this time the uterus should be hard, round and movable when you palpate the abdomen. You should be able to feel it midway between the mother's umbilicus (belly button) and her pubic bone. There should be no bleeding from the vagina. The bladder should be empty.

Step 4 Massage the uterus

Right after the placenta is delivered, rubbing the uterus is a good way to contract it and stop the bleeding. Many women need their uterus rubbed to help it to contract (Figure 6.4).

Figure 6.4 Rub the uterus immediately after the birth, then every 15 minutes for 2 hours, then every 30 minutes. Show the woman how to rub her own uterus, or a relative may help.

Step 5 Examine the placenta and fetal membranes

You must look carefully at the placenta to be sure that none of it is missing.

- From your knowledge of the anatomy of the placenta (*Antenatal Care* Module, Study Session 5), which is the 'maternal' surface — the top side where the umbilical cord emerges, or the underside (bottom) of the pelvis?

- The maternal surface of the placenta is the underside, opposite to the side where the umbilical cord emerges.

If a portion of the maternal surface (bottom of the placenta, see Figure 6.5) is missing, or there are torn membranes with blood vessels, suspect that retained placenta fragments remain in the uterus and refer the mother quickly.

Figure 6.5 Checking the underside (maternal surface) of the placenta to see if it is intact.

- Can you explain why?
- She is more at risk of postpartum haemorrhage if a piece of the placenta is retained in the uterus.

The irregular rounded shapes on the underside of the placenta are called *lobes* (some textbooks call them *cotyledons*). By contrast the top of the placenta (the side that was facing the baby) is smooth and shiny. The cord attaches on this side, and then spreads out into many deep-blue blood vessels that look like tree roots (Figure 6.6).

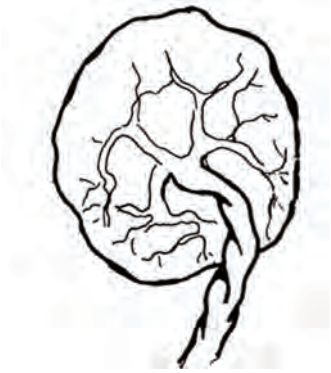


Figure 6.6 The top of the placenta.

Checking the placenta for completeness

1 Hold the placenta in the palms of your hands, with the maternal side facing upward. Make sure that all the lobules are present and fit together.

2 Then hold the cord with one hand, allowing the placenta and membranes to hang down.

3 Place the other hand inside the membranes, spreading the fingers out, to make sure that the membranes are complete (Figure 6.7).

Figure 6.7 Hold the membranes open like this to check they are complete.

4 Ensure that the position of cord attachment to the placenta is normal, and inspect the cut end of the cord for the presence of two arteries and one vein (Figure 6.8).

5 Safely dispose of the placenta by either burying it where it will not be dug up by animals, or incinerate it if you have the facilities to do so in your community.

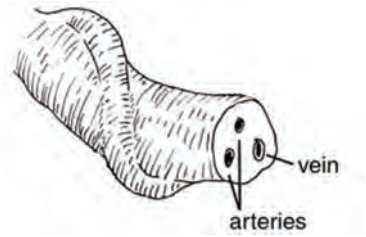


Figure 6.8 The cut end of the cord has two arteries and one vein.

6 If the membranes tear, gently examine the upper vagina and cervix of the woman. You must wear sterile/disinfected gloves and use a sponge forceps to remove any pieces of membrane that are present.

It is dangerous for the mother if any parts of the placenta or membranes are left behind in the uterus.

Figure 6.9 Placental examination (using a dummy placenta) demonstrating correct inspection of the maternal surface (underside). The lobes should complete: no tear or sign of breakage when the placenta is stretched flat over the health worker's hand.

Step 6 Examining for cuts, tears and bleeding

The anatomical terms in this section were all explained and illustrated in Study Session 3 of the *Antenatal Care* Module, Part 1 (see Figure 3.2). To complete the management of the third stage of labour, do the following:

1 Gently separate the labia and inspect the lower vagina and perineum for lacerations that may need to be repaired to prevent further blood loss (Figure 6.10).

2 Gently cleanse the vulva and perineum with boiled (then cooled) warm water or a weak antiseptic solution.

3 Apply a clean pad or cloth with firm pressure to the area that is bleeding for about 10 minutes. If bleeding continues after this time, refer the woman immediately, keeping the pressure applied to the wound.

4 Monitor the woman every 15 minutes - this means measuring her vital signs, massaging her uterus to ensure that it is contracted and checking for excessive vaginal bleeding.

Figure 6.10 A deep tear in the vagina can lead to postpartum haemorrhage.

■ Why is it important to complete the six steps of AMTSL in a particular order and what is that order?

□ Keeping to the exact order of actions is important, because the evidence on which AMTSL is based shows that if it is correctly applied (including in the right order) it can reduce the risk of PPH by 60%. Refer back to Box 6.2 if you can't remember the order of the six steps.

6.3 Intervention in complications after applying AMTSL

6.3.1 Excessive bleeding (postpartum haemorrhage or PPH)

You will learn the definition of excessive bleeding and the actions to take if the woman has postpartum haemorrhage (PPH) in Study Session 11 of this Module; it also describes the interventions you can take during and after the third stage of labour to reduce the risk of PPH. The main points are summarized briefly here.

- Rubbing the uterus and (if you have been trained to do it) using the two-handed pressure method (Study Session 11).
- Giving a second dose of oxytocin 10 IU by intramuscular injection, or a second dose of misoprostol 400 µg rectally (by pushing the tablets gently into the rectum through the woman's anus), or by putting the tablets under her tongue where they can slowly dissolve.
- Initiating breastfeeding immediately after delivery: the contractions that expel the milk will also make the uterus contract.

Do not give additional misoprostol if oxytocin was the drug used originally.

Remember not to exceed 1,000 µg of misoprostol (5 tablets). If the woman has already taken 600 µg (3 tablets) after the birth of the baby, and she needs a second dose because of excessive bleeding, it should be no more than 400 µg (2 tablets) via the rectum. This way, the woman will have fewer side-effects. If she did not take 600 µg of oral misoprostol after the birth of the baby and has signs of excessive bleeding, give her 1,000 µg of misoprostol via the rectum in one dose.

If excessive bleeding occurs, the mother should be taken to the health facility immediately. You will learn what to do on the journey in Study Session 11.

If the bleeding does not stop quickly after the second dose of misoprostol, then refer the woman to the nearest health facility urgently. Sometimes, bleeding comes from a torn vagina, a torn cervix, or a torn uterus. Usually this bleeding comes in a constant, slow trickle. The blood is usually bright red and thin. Actions to take while waiting for transport:

- Lie the mother down with her feet higher than her head and her head turned sideways; keep her warm with blankets.
- Secure an intravenous (IV) line and begin fluid infusion with Normal Saline or Ringer's Lactate solution. (You learned how to do this in Study Session 22 of the *Antenatal Care* Module and your practical skills training.) You may be trained to add a further dose of oxytocin to the fluids in the IV bag, but this is only possible if you can keep the drug refrigerated until needed.
- Keep the area of the vulva and perineum clean.
- Arrange to accompany the mother to the hospital if at all possible.
- Also ask family members or friends to go with the mother and look after the baby (and to be possible blood donors).

6.3.2 Retained placenta

Retained placenta is when the placenta remains in the uterus beyond 30 minutes after the birth of the baby. If this happens:

- Do not attempt further controlled cord traction to separate the placenta.
- Follow the instructions for pre-referral treatment as given above for PPH and get the woman to a health facility for emergency care as quickly as possible.

Summary of Study Session 6

In Study Session 6 you have learned that:

1 Active management of third stage of labour (AMTSL) is the best intervention to reduce the risk of PPH by more than 60%. Therefore, AMTSL has to be applied routinely (to all delivering mothers).

2 The sequential physiological changes in the third stage of labour are: separation of the placenta, descent of the placenta, expulsion of the placenta and control of bleeding.

3 Common complications that can occur during third stage of labour include retained placenta, postpartum haemorrhage and uterine inversion.

4 The components of AMTSL in sequential order are checking for a second baby, administration of uterotonic drugs, controlled cord traction, uterine massage after delivery of the placenta, placental examination for completeness, and examining the genital area for lacerations and active bleeding.

5 Oxytocin, ergometrine and misoprostol are commonly used uterotonic drugs. Because ergometrine is a very strong drug, it is not recommended for use in Ethiopia's rural Health Extension Service. Oxytocin and ergometrine must always be kept in a refrigerator until needed; misoprostol comes in tablet form.

6 Administer misoprostol or oxytocin within one minute of the delivery of the baby.

7 A well-contracted uterus is felt as firm to hard, well delineated and with no active vaginal bleeding, unless the source of bleeding is due to tear or lacerations of the lower genital area.

8 Missed placental lobe, retained placenta, relaxed enlarged soft uterus, bleeding continuing despite the repeat administration of uterotonic drugs and uterine massage are all indications for setting up an intravenous line for pre-referral IV fluid infusion and immediate referral to a health facility.

Self-Assessment Questions (SAQs) for Study Session 6

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the following questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 6.1 (tests Learning Outcomes 6.1 and 6.2)

(a) How do you define the third stage of labour?
(b) What physiological changes happen during the third stage of a normal uncomplicated labour?

SAQ 6.2 (tests Learning Outcomes 6.1 and 6.3)

Alemitu is a Health Extension Practitioner (HEP) in a village Health Post. She has just delivered a baby at her Health Post and the mother is in the third stage of labour, and has begun breastfeeding. Alemitu has been trained to use AMTSL. What, in detail, are the six steps that she must follow in order to do this?

SAQ 6.3 (tests Learning Outcome 6.3)

Imagine that you have managed the third stage of labour for a woman in your community by correctly using AMTSL, but she has developed continuous bleeding.

(a) Do you provide additional misoprostol? If yes, what dose should you give her and in what form?
(b) What else could you do?
(c) What should you do if the woman continues to bleed?

SAQ 6.4 (tests Learning Outcome 6.6)

What are the warning signs for the complications that may arise during the third stage of labour?

Study Session 7 Neonatal Resuscitation

Introduction

The moment when a baby is born is also the time when the birth attendant has to make a very rapid assessment of the condition of the newborn to decide whether it needs helping to breathe. Within a few seconds you have to be able to identify the general danger signs in a newborn that tell you to intervene quickly to protect it from developing serious complications, or even dying, because it is not able to get enough oxygen into its body. Of course, most babies breathe spontaneously as soon as they are born and all you need to do is follow the steps of basic newborn care, which were briefly outlined in Study Session 5 of this Module. You will learn them in much greater detail in the Module on *Postnatal Care* and the steps will be covered again in the Module on *Integrated Management of Newborn and Childhood Illness.*

However, in this study session our focus is on newborns who are *not* breathing well, and what you need to do in order to resuscitate them and get them breathing normally. You will learn how to distinguish between a healthy baby and one that is moderately or severely **asphyxiated** (i.e. short of oxygen due to breathing problems), and the correct action that you should take. This study session is unusual in that much of it is taught through diagrams.

Learning Outcomes for Study Session 7

When you have studied this session you should be able to:

7.1 Define and use correctly all of the key words printed in **bold**. (SAQ 7.2)

7.2 Summarise the most important signs of neonatal asphyxia that mean you should begin neonatal resuscitation. (SAQ 7.1)

7.3 Explain how newborns can be helped to breathe by applying standard resuscitation techniques. (SAQs 7.1 and 7.2)

7.4 Identify the equipment you will need to give newborn resuscitation and how it should be used correctly. (SAQ 7.3)

7.5 Describe the things you should *not* do when assessing a newborn for possible breathing difficulties. (SAQ 7.4)

7.6 Summarise the main health risks to newborns and the activities that form the basis of essential newborn care. (SAQ 7.5)

7.1 Newborn respiration and resuscitation

We begin by briefly summarizing what usually happens when a newborn makes the transition from life in its mother's uterus, to life in the outside world, where it must breathe for itself.

7.1.1 Breathing in a healthy newborn

Normally, a healthy baby starts to breath spontaneously immediately after delivery (Figure 7.1). If the breathing started spontaneously and is sustained by the baby without assistance, it indicates that:

- The fetus was not asphyxiated while in the uterus
- The respiratory system is functioning well
- The cardiovascular system (heart and blood vessels) is functioning well

- There is coordination by the brain of the movements required for sustained rhythmical breathing (brain is functioning well).

Figure 7.1 A full-term normal newborn who is breathing well has pinkish skin colour and semi-flexed arms and legs; he has made a good transition from the mother's uterus to the outside world. (Photo: Dr Mulualem Gessese)

■ How do you check fetal wellbeing during labour and delivery?

□ A healthy fetus has a heart rate between 120–160 beats/minute. When the fetal membranes rupture, the amniotic fluid that leaks from the mother's vagina is clear, not heavily blood-stained or coloured greenish-black by **meconium** — the baby's first stool.

If you checked the fetal heart rate at regular intervals all through the mother's labour, and recorded the result on the partograph (as you learned in Study Session 4), you should have referred any mother whose unborn baby showed signs of fetal distress. Therefore, it should be relatively uncommon for you to deliver an asphyxiated baby. However, complications in childbirth can develop unpredictably, or you may be called to a woman who is already far advanced in the second stage of labour when you reach her. Therefore, you need to know how to provide neonatal resuscitation in case you deliver an asphyxiated baby.

7.1.2 Newborn asphyxia

As you learned in Study Session 4 of this Module, **asphyxia** (shortage of oxygen) in the uterus is due to an inadequate supply of oxygen from the mother's blood or a problem in the placenta. This may result in:

- Asphyxia at birth (mild, moderate or severe)
- Learning difficulties or cognitive impairment, which become apparent during childhood development; they are due to brain cells being destroyed by lack of oxygen during labour and delivery.
- Death of the newborn.

Gas exchange is when oxygen from the inhaled air is absorbed into the blood as it passes through the lungs, and waste carbon dioxide is released from the blood into the air that is breathed out

However, neonatal asphyxia is mainly due to failure of the newborn to breathe after birth, or its heart fails to pump enough blood to the lungs for **gas exchange**, or it has low haemoglobin levels (anaemia) so it cannot deliver enough oxygen around the body. The baby who cannot breathe cannot establish independent life outside the mother. Therefore, the purpose of neonatal resuscitation is to help the newborn to establish spontaneous breathing and facilitate oxygen delivery to its organs and tissues – particularly the brain, which is very quickly damaged by oxygen shortage. You may also

need to resuscitate any baby that is severely anaemic due to blood loss during labour and delivery, or that continues to be *cyanotic* despite established breathing. **Cyanosis** is a bluish discolouration of the lips and skin, which occurs when there is insufficient oxygen in the blood (Figure 7.2).

Figure 7.2 A preterm newborn with problems: she looks cyanotic (bluish), her limbs are floppy because her muscle tone is not strong, and she has breathing problems. (Photo: Dr Mulualem Gessese)

To avoid the immediate and long-term complications of asphyxia, in addition to the labour and delivery care that you provide to the mother, and the routine newborn care of the baby (e.g. cutting the cord, keeping the baby warm), you also have to provide life-saving interventions for any newborn who cannot breathe properly.

7.2 Types of neonatal resuscitation

There are three techniques that you will learn about in this study session and in your practical skills training. They are:

- **Ventilation**: using a hand-operated pump called an **ambu-bag** (Figure 7.3), which pumps air into the baby's lungs through a mask fitted over its nose and mouth. (You may hear health professionals referring to ventilation as 'ambu-bagging'.)

Figure 7.3 Resuscitation technique practiced with a ventilator (ambu-bag) on a training doll. (Photo: Dr Yifrew Berhan)

- **Suctioning**: using a device called a bulb syringe to extract mucus and fluid from the baby's nose and mouth.

- **Heart massage**: pressing on the baby's chest in a rhythmic way to stimulate the heartbeat (Figure 7.4).

Figure 7.4 Cardiac massage technique practiced on a training doll. You can see a ventilator at the top right of the picture. (Photo: Dr Yifrew Berhan)

7.2.1 Basic equipment needed for newborn resuscitation

- Two clean linen/cotton cloths: one to dry the newborn and one to wrap him or her afterwards
- Plastic bulb syringe to remove secretions from the mouth and nose, especially when meconium is present
- Ambu-bag and mask to give oxygen directly into the baby's lungs
- A person trained in neonatal resuscitation (like you)
- Heat source (lamp) to provide warmth, if possible.

7.2.2 Before you start resuscitation

Before you apply any form of resuscitation, make sure that:

- *The baby is alive*: If the newborn doesn't appear to be alive, FIRST listen to its chest with a stethoscope. If there is no heartbeat, the baby is already dead (see Table 7.1 below).
- *You graded the extent of asphyxia*: If you can hear a heartbeat, but you estimate it to be *less* than 60 beats/minute, apply heart massage *first*, then ventilate alternately on and off, till the heartbeat is above 60 beats/minute (see Table 7.1 below).
- *The baby is not deeply meconium stained*: If the baby's skin is stained with meconium, or the oral and nasal cavities are filled with meconium-stained fluid (Figure 7.5 on the next page), you should *not* resuscitate before suctioning the oral, nasal and pharyngeal areas. Ventilation will aggravate the baby's breathing problem because it will force the meconium-stained fluid deep into the baby's lungs, where it will block the gas exchange.

Figure 7.5 A baby who is not breathing (no signs of chest or nose movement) and with meconium stained all over its body. (Photo: Dr Mulualem Gessese)

7.3 Assessing the degree of asphyxia

Moderate to severely asphyxiated babies usually require intensive resuscitation, so the next thing you have to learn is how to grade asphyxia in a newborn. Within no more than 5 seconds after the birth, you should make a very rapid assessment to find out whether the baby is alive or dead, and (if it is alive) to assess whether it has any degree of asphyxia. A severely asphyxiated baby may not breathe at all, there may be no movement of its limbs (arms and legs), and the skin colour may be deeply blue or deeply white. A baby who is not breathing at all after birth, or who is only gasping for breath, or who is breathing less than 30 breaths per minute needs help immediately. If a baby does not breathe soon after birth, it may get brain damage or die. Most babies who are not breathing can be saved if resuscitated correctly and quickly.

From Table 7.1, you can learn how to assess a newborn's degree of asphyxia. Also look again at the three photos of newborns with different level of asphyxia (Figures 7.1, 7.2 and 7.5).

Table 7.1 Assessing the degree of asphyxia.

Signs	**No asphyxia**	**Mild asphyxia**	**Moderate asphyxia**	**Severe asphyxia**
Heart rate	Above 100 beats/minute	Above 100 beats/minute	Above 60 beats/minute	Below 60 beats/ minute
Skin colour	Pink	Mild blue	Moderately blue	Deeply blue
Breathing pattern	Crying	Crying	Breathing but not strong	Not breathing, or gasping type
Limb movement	Moving well	Weakly moving	Floppy	Floppy
Meconium-stained	No	No	Maybe	Usually
Resuscitation	No need	Fast response	Good response	Takes a long time to respond

Gasping is when the newborn can take only a few breaths with difficulty and with wide gaps in between; it is usually a sign that the baby is close to death.

Assessment of the degree of asphyxia should not take you more than 5 seconds. Do it fast but don't panic.

Since neonatal resuscitation is an action that you need to perform rapidly (within one minute after delivery), it is better to *estimate* than to count the heart rate, and to *observe the pattern* of breathing rather than to count the respiratory rate. Table 7.2 gives you a simplified description of the signs that indicate what is normal and abnormal immediately after birth.

Table 7.2 Normal and abnormal physical findings in the newborn immediately after birth.

Signs	Normal findings	Abnormal findings
Colour	Should be pink	Blue or cyanosed (shortage of oxygen) White, pallor (anaemia) Yellowish (jaundice)
Breathing	40–60 breaths/minute	No breathing Breathing rate less than 30/minute Gasping (very few breaths with difficulty breathing)
Heart rate	120–160 beats/minute	No heartbeat at all Heartbeat less than 100/minute
Muscle tone	Full term newborn has semi-flexed arms and legs (Figure 7.1)	Poor flexion of the limbs; arms and legs floppy (Figure 7.2), indicates moderate to severe asphyxia affecting the brain
Reflexes	Baby responds to a finger put into the roof of its mouth	No response to touching the roof of the baby's mouth

'Less than' can be replaced by the < symbol, as in <30/min. 'More than' can be replaced by the > symbol, as in >30/min.

7.4 Neonatal resuscitation procedures

Before you go to attend any delivery, you should make certain that you have prepared the equipment necessary to apply neonatal resuscitation and give immediate care to the newborn if required. In this section we move on to the actions that you should take once you have assessed the degree of asphyxia.

7.4.1 The first five seconds

Table 7.3 (on the next page) summarises what you should do in the first 5 seconds after the baby is born if the signs of asphyxia are present. After you have seen this overview, we will look at the specific actions in detail.

Table 7.3 Actions in response to signs of neonatal asphyxia.

What is the newborn doing?	Assessment	Action
Crying and moving limbs	Probably a healthy baby	Resuscitation not needed
Weak breathing, not moving limbs, moderate cyanosis	Probably **moderately asphyxiated**	Assist breathing by on and off ventilation (as described in Section 7.4.8)
Not crying, breathing or gasping; not moving limbs/ floppy; may be cyanosed or meconium stained	Probably **severely asphyxiated**	Estimate heart rate Call an assistant (family member or other) Suction the oral, nasal and pharyngeal area in less than 5 seconds using a bulb syringe On and off ventilation
As above	Heart rate above 60 beats/minute	
As above	Heart rate below 60 beats/minute	As above, but with the addition of cardiac massage (see Figure 7.4)

7.4.2 Checking the newborn's heart rate

The **apical heartbeat** (or AHB) is just another name for the heartbeat heard through a stethoscope over the area of the heart on the left side of the chest, as shown in Figure 7.6. It is called 'apical' because the heartbeat is heard directly from the surface of the heart.

- ■ What is the name given to the number of heartbeats per minute measured away from the the heart?
- □ It is called the pulse rate.

The newborn's heartbeats can also be counted by feeling the pulse at the base of the umbilical cord, as shown in Figure 7.6.

Figure 7.7 Checking and counting the apical heartbeat (AHB) and feeling for the pulse at the base of the umbilical cord.

7.4.3 The initial actions

The list below sets out the actions you should take for *all* newborns in the sequence shown, irrespective of the degree of asphyxia:

1 Fast drying as shown in Figure 7.8
2 Keeping the baby warm.
3 Clearing the mouth and nose as shown in Figure 7.9
4 Apply gentle tactile stimulation to initiate or enhance breathing as shown in Figure 7.10
5 Simultaneously assessing the degree of asphyxia as shown earlier in Tables 7.1 to 7.3
6 Positioning the baby for resuscitation if there are signs of asphyxia, as shown in Figure 7.11

Now study each of these figures in turn. Look at them carefully and make sure that you read the captions and other notes associated with them.

7.4.4 Dry the baby quickly and keep it warm

Lay the baby on a warm surface away from drafts. Use a heat lamp or other overhead warmer, if available. Then dry the baby as shown in Figure 7.8.

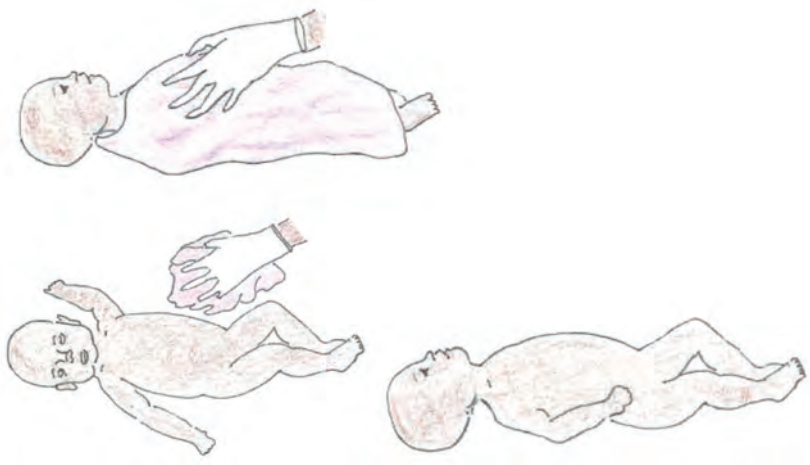


Figure 7.8 How to dry the baby: (top) lay the baby on its back and dry it thoroughly; (bottom left) remove the wet cloth; (bottom right) tilt the baby's chin to reposition the baby's head and keep its airway open.

Place the baby in skin-to-skin contact with the mother, covered by a warm blanket. Place a warm cap or shawl to cover the baby's head.

7.4.5 Clearing the mouth and nose

If a bulb syringe is available:

Suction the mouth first, then the baby's nose ('m' before 'n') — see Figure 7.9.

No deep suctioning with a bulb syringe! It can cause slowing of the heart rate (bradycardia).

If no bulb syringe:

Clear secretions from the mouth and nose with a clean, dry cloth.

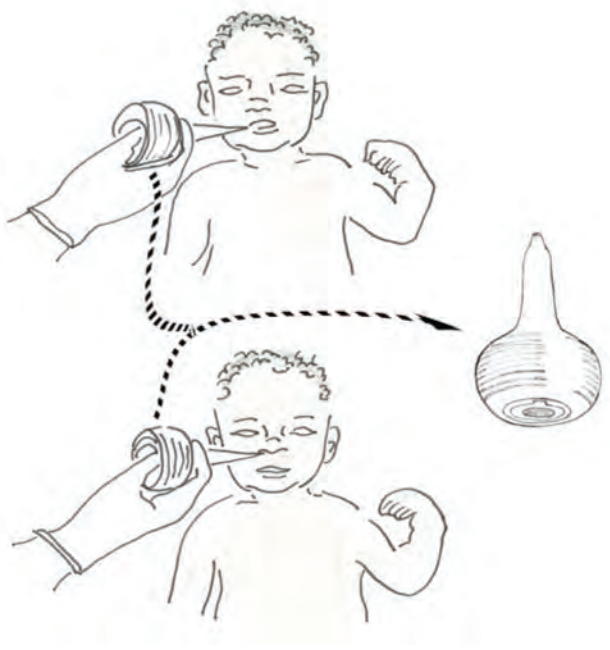


Figure 7.9 Suctioning the newborn with a bulb syringe to clear mucus from its upper airway: (top) suction the mouth first; (bottom) then suction the baby's nose ('m' before 'n').

7.4.6 Apply gentle tactile stimulation to initiate or enhance breathing

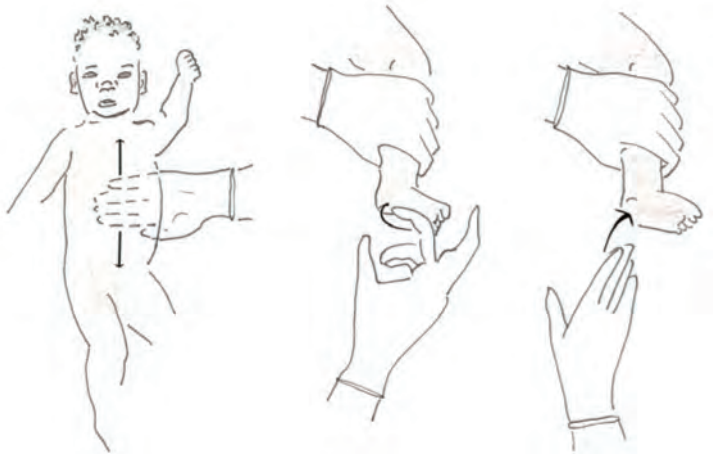


Figure 7.10 How to give gentle tactile stimulation: (left) rub the baby's abdomen up and down; (centre and right) flick the underside of the baby's foot with your fingers.

DO NOT stimulate by:

- Slapping the back
- Squeezing the rib cage
- Forcing the baby's thighs into its abdomen
- Dilating the anal sphincter (the ring of muscle that closes the anus)
- Hot or cold compresses or baths
- Shaking the umbilical cord.

These types of stimulation are dangerous and can damage the newborn.

7.4.7 If you diagnose asphyxia, start resuscitation!

Position the newborn on his or her back with the neck slightly extended as shown in the top picture in Figure 7.11. Open the airway by clearing the mouth and nose with suction using the bulb syringe as you saw previously in Figure 7.9.

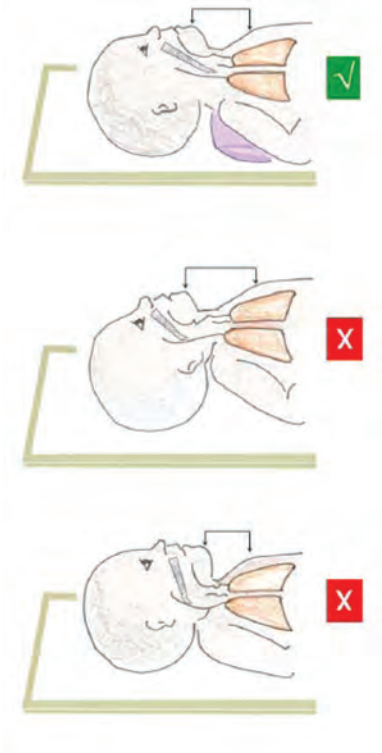


Figure 7.11 How to position the newborn's head to keep its airway open: (top) correct, the baby's chin is tilted the right amount; (middle) the baby's head is tilted too far back, placing pressure on the windpipe in its neck; (bottom) the baby's head is not tilted enough — its chin is too close to its chest and the airway is compressed.

- Position yourself at the head of the baby (see Figure 7.12).

Figure 7.12 The correct position for newborn resuscitation using an ambu-bag.

If the apical heartbeat is > (more than) 60 beats/minute:

- Ventilate with the appropriate size of mask and a self-inflating ambu-bag. The mask should be fitted as shown in Figure 7.13. Make a firm seal between the mask and the baby's face, so air cannot escape from under the edges of the mask. But don't force the mask down onto the baby's face, because this could push its chin down towards its chest (bottom diagram in Figure 7.11) and compress its airway.

If the apical heart beat is < (less than) 60 beats/minute:

- Apply heart massage (look back at Figure 7.4) and ventilate alternately (on and off ventilation) with the ambu-bag.

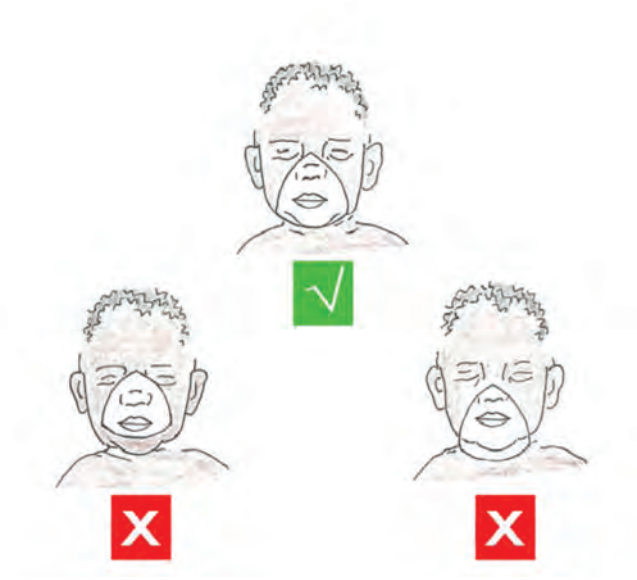


Figure 7.13 Correct and incorrect size of mask: (top) correct: Covers mouth, nose, and chin; (bottom left) incorrect: too large — covers eyes and extends over chin; (bottom right) incorrect: too small — does not cover nose and mouth.

7.4.8 Ventilate at 40 breaths per minute

Count out loud: 'Breathe — two — three' as you ventilate the baby (see Figure 7.14 on the next page). Squeeze the bag as you say 'Breathe' and release the pressure on the bag as you say 'two — three'. This helps you to ventilate with an even rhythm, at a rate that the newborn's lungs are naturally adapted to.

The amount of air you are moving into and out of the lungs is the equivalent of about 40 breaths per minute. Apply enough pressure to create a noticeable, gentle rise and fall in the baby's chest. The first few breaths may require higher pressures, but if the baby appears to be taking a very deep breath, you are using too much pressure.

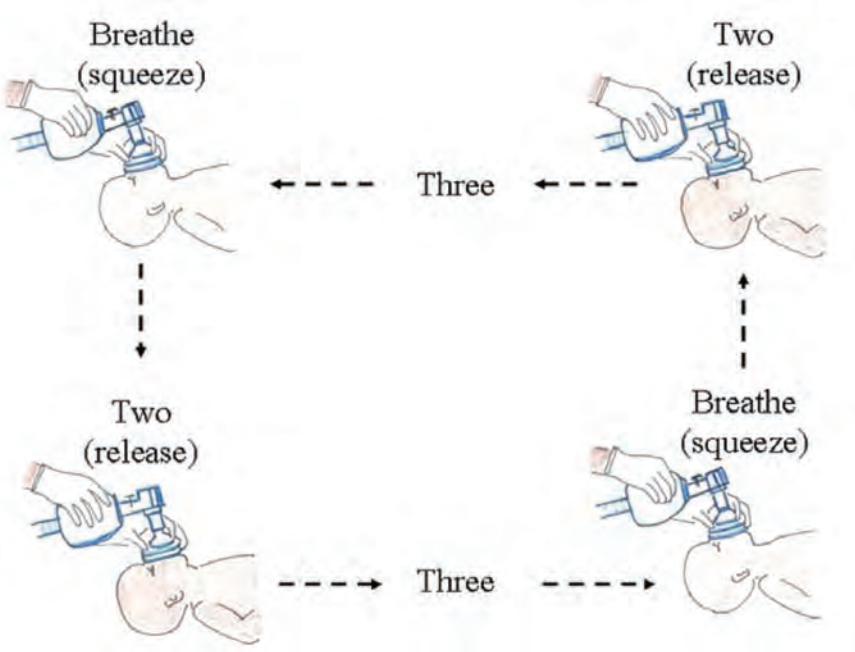


Figure 7.14 Timing the rate of ventilation as you say 'Breathe — two — three'.

7.4.9 Evaluate the baby during ventilation

The best sign of good ventilation and improvement in the baby's condition is an increase in heart rate to more than 100 beats/minute.

- What other change would you expect to see in the baby while you are ventilating it, if the resuscitation is going well?

- You would expect to see the baby's skin colour change from bluish or very pale, to a healthier pinkish colour. You may also see the baby begin to move a little bit, beginning to flex its limbs and look less floppy.

When you stop ventilating for a moment, is the baby capable of spontaneous breathing or crying? These are good signs. Many babies recover very quickly after a short period of ventilation, but keep closely monitoring the baby until you are sure it is breathing well on its own.

If the baby remains weak or is having irregular breathing after 30 minutes of resuscitation, refer the mother and baby urgently to a health centre or hospital where they have facilities to help babies who are having difficulty breathing. Go with them and keep ventilating the baby all the way. Make sure it is kept warm at all times. Newborns easily lose heat and this could be fatal in a baby that can't breathe adequately on its own.

Figure 7.15 summarises the steps in newborn resuscitation which you have learned in Section 7.4.

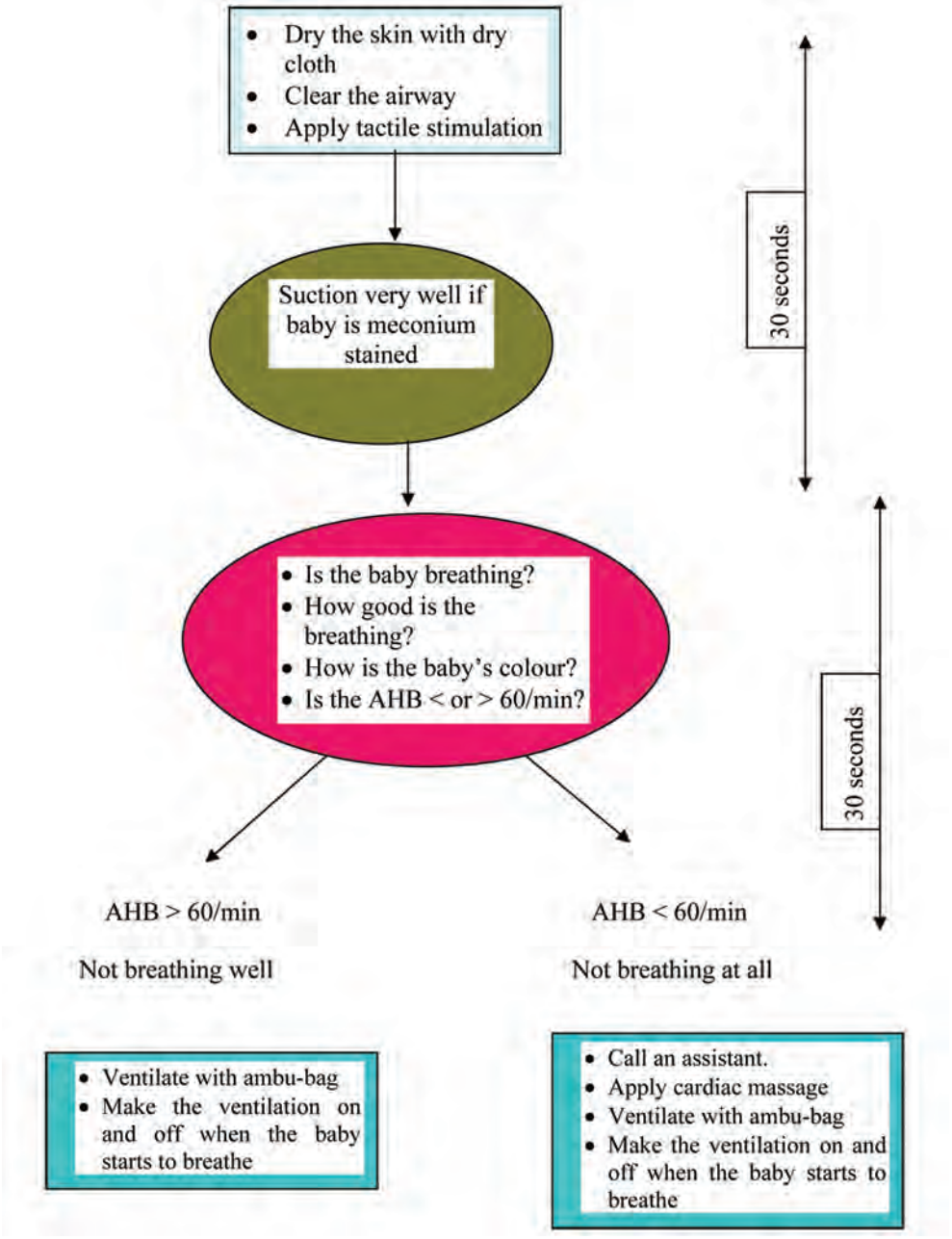


Figure 7.15 A summary of the steps in newborn resuscitation in the form of a flow chart.

7.5 Immediate essential newborn care

We end this study session with a reminder about essential newborn care, which you should conduct with all babies, regardless of whether they have any signs of asphyxiation. When the baby's umbilical cord is cut, there are many physiological changes inside the baby's body to allow it to make the necessary adaptation to life outside its mother. It is generally tougher to survive in the outside world than in the relative safety of the uterus, so we need to provide basic care to the newborn to help it resist some potential health risks listed in Box 7.1.

Box 7.1 Health risks to newborns

Newborns need additional care to prevent:

- Spontaneous bleeding, usually from the gastrointestinal tract, due to Vitamin K deficiency
- Bleeding due to birth trauma (usually manifested late after delivery with swelling over scalp that requires immediate referral)
- Eye infections due to *Chlamydia trachomatis* and *Neisseria gonorrhea* (bacteria which are common causes of sexually transmitted infections; the baby can acquire these infections as it passes through the birth canal)
- Some vaccine preventable diseases such as poliomyelitis and tuberculosis
- Hypothermia (becoming too cold)
- Hypoglycaemia (low blood glucose level)
- Mother-to-child transmission of HIV, if the mother is HIV-positive.

Vaccine preventable diseases are discussed in detail in the *Communicable Diseases* Module, Study Sessions 3 and 4.

Prevention of mother-to-child transmission (PMTCT) of HIV is covered in the *Antenatal Care* Module, Study Session 17; the drugs and procedures for PMTCT are given in the *Communicable Diseases* Module, Study Session 27.

With the health risks in Box 7.1 in mind, make sure that you give all newborn babies the following essential care:

- Tie the umbilical cord two finger-widths from the baby's abdomen and place a second tie two finger-widths away from the first one. Cut the cord between the first and second ties. Check that the umbilical cord stump is not bleeding and is not cut too short
- Apply tetracycline eye ointment once only, to prevent eye infections.
- Inject vitamin K (1 mg, intramuscularly) into the front of the baby's mid-thigh to prevent spontaneous bleeding.
- Give the first dose of oral polio vaccine and BCG vaccine (against tuberculosis) according to the guidelines in the Ethiopian Expanded Programme of Immunization (EPI).
- The body temperature of the newborn must remain above 36°C. Place the baby on the mother's abdomen in skin-to-skin contact with her, where it can breastfeed. Cover them both with a blanket and put a warm hat or shawl over the baby's head.
- Ensure that the baby is suckling well and the mother's breast is producing adequate milk. If breastmilk is not preferred, make sure that adequate replacement feeding is ready. Initiate early and exclusive breastfeeding unless there are good reasons to avoid it, e.g. in an HIV-positive mother.
- The baby should get preventive treatment to protect it from HIV if its mother is HIV-positive.

The vaccination schedule for all the vaccines in the EPI are described in full in the *Immunization* Module.

You will learn all about breastfeeding in the *Postnatal Care* Module. Breastfeeding and HIV are covered in the *Communicable Diseases* Module, Study Session 27.

Summary of Study Session 7

In Study Session 7, you have learned that:

1 The most important signs of asphyxiation in newborns at delivery are: difficulty breathing, gasping or no breathing; abnormal heart beat; poor muscle tone (floppy limbs); lack of movement; bluish skin colour (cyanosis), and being stained with meconium.

2 Assessment of the degree of asphyxia should be done in the first 5 seconds after the birth, at the same time as commencing basic newborn care (e.g. drying the baby, keeping it warm, tying and cutting the cord, etc).

3 Swift action is necessary to begin resuscitating a baby who is not breathing well, after you have suctioned its mouth and then its nose.

4 Check that the baby is alive (listen for an apical heartbeat); that the heart rate is above 60 beats/minute (begin heart massage *before* resuscitation if the heart rate is less than 60 beats/minute); and that the baby is not stained with meconium, which must be suctioned out *before* resuscitation can begin.

5 Position the baby with its neck extended to open the airways; place a correctly fitting ventilation mask over the baby's mouth and nose, and begin ventilating at a rate of about 40 breaths per minute.

6 Watch for signs of improvement: e.g. pinkish colour, movement, ability to breathe unaided, etc. Refer urgently if this has not been achieved after 30 minutes of ventilation.

7 Remember to conduct all the activities of essential newborn care, including cord care, giving a vitamin K injection and tetracycline eye ointment, establishing early and exclusive breastfeeding, and ensuring that anti-HIV medication is given to prevent mother-to-child-transmission.

Self-Assessment Questions (SAQs) for Study Session 7

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the following questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 7.1 (tests Learning Outcomes 7.2 and 7.3)

First read Case Study 7.1 and then answer the questions that follow it.

Case Study 7.1 Atsede's baby can't breathe

A 25 year-old woman called Atsede was brought to your Health Post after being in labour for 38 hours at home. Soon after she reached you, she gave birth to a full term baby boy. You assessed the baby and found he was not making any breathing effort, he had no movement of his limbs and his whole body was covered with meconium-stained amniotic fluid. When you dried him and applied tactile stimulation, the baby still didn't show any effort to breathe.

(a) Is this baby asphyxiated? If yes, what is the degree of asphyxia?
(b) What are your immediate next steps? Then what do you do?
(c) Could the birth complication in this newborn have been prevented, and if so, how?

SAQ 7.2 (tests Learning Outcomes 7.4

List the basic equipment you will need in order to resuscitate a newborn with breathing difficulties.

SAQ 7.3 (tests Learning Outcomes 7.1, 7.2, 7.4, 7.5 and 7.6)

Which of the following statements is *false?* In each case say what is incorrect.

A If a newborn cries soon after birth, it is a sign of asphyxia occurring before delivery.

B Cyanosis means being covered with meconium all over the body.

C The apical heartbeat can be detected by listening to the baby's chest with a stethoscope.

D Gas exchange in the lungs happens when carbon dioxide is breathed in and oxygen is breathed out.

E Giving the newborn a Vitamin K injection is to prevent eye infections.

F The recommended ventilation rate for newborns is 40 breaths/minute.

SAQ 7.4 (tests Learning Outcome 7.4)

Which of the following ways of stimulating the newborn are recommended, and which are dangerous and not allowed?

- Slapping the back
- Rubbing the abdomen gently up and down
- Squeezing the rib cage
- Forcing thighs into the abdomen
- Flicking the underside of the baby's foot with your fingers
- Dilating the anal sphincter
- Hot or cold compresses or baths
- Shaking the umbilical cord.

SAQ 7.5

Table 7.1 summarises some common health risks to newborns and the immediate essential care to prevent those complications. Some of the boxes have been left blank for you to complete.

Table 7.1 for use with SAQ 7.5

Newborn health risk	**Essential newborn care**
Eye infection	
Spontaneous bleeding	
	Hypothermia
	Hypoglycaemia

Study Session 8 Abnormal Presentations and Multiple Pregnancies

Introduction

In previous study sessions of this module, you have been introduced to the definitions, signs, symptoms and stages of normal labour, and about the 'normal' *vertex* presentation of the fetus during delivery. In this study session, you will learn about the most common abnormal presentations (breech, shoulder, face or brow), their diagnostic criteria and the required actions you need to take to prevent complications developing during labour. Taking prompt action may save the life of the mother and her baby if the delivery becomes obstructed because the baby is in an abnormal presentation. We will also tell you about twin births and the complications that may result if the two babies become 'locked' together, preventing either of them from being born.

Learning Outcomes for Study Session 8

After studying this session, you should be able to:

8.1 Define and use correctly all of the key words printed in **bold**. (SAQs 8.1 and 8.2)

8.2 Describe how you would identify a fetus in the vertex presentation and distinguish this from common malpresentations and malpositions. (SAQs 8.1 and 8.2)

8.3 Describe the causes and complications for the fetus and the mother of fetal malpresentation during full term labour. (SAQ 8.3)

8.3 Describe how you would identify a multiple pregnancy and the complications that may arise. (SAQ 8.4)

8.4 Explain when and how you would refer a woman in labour due to abnormal fetal presentation or multiple pregnancy. (SAQ 8.4)

8.1 Normal and abnormal presentations

8.1.1 Vertex presentation

In about 95% of deliveries, the part of the fetus which arrives first at the mother's pelvic brim is the highest part of the fetal head, which is called the **vertex** (Figure 8.1). This presentation is called the **vertex presentation**. Notice that the baby's chin is tucked down towards its chest, so that the vertex is the leading part entering the mother's pelvis. The baby's head is said to be 'well-flexed' in this position.

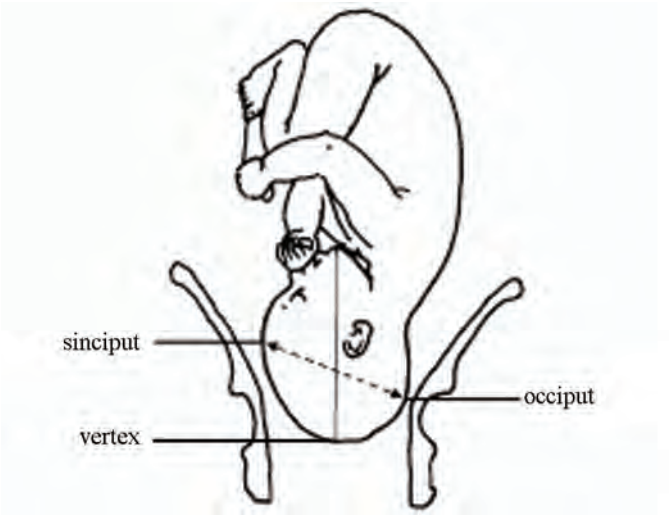


Figure 8.1 A baby in the well-flexed vertex presentation before birth, relative to the mother's pelvis. (Source: WHO, *Managing Complications in Pregnancy and Childbirth.*)

During early pregnancy, the baby is the other way up — with its bottom pointing down towards the mother's cervix — which is called the **breech presentation**. This is because during its early development, the head of the fetus is bigger than its buttocks; so in the majority of cases, the head occupies the widest cavity, i.e. the **fundus** (rounded top) of the uterus. As the fetus grows larger, the buttocks become bigger than the head and the baby spontaneously reverses its position, so its buttocks occupy the fundus. In short, in early pregnancy, the majority of fetuses are in the breech presentation and later in pregnancy most of them make a spontaneous transition to the vertex presentation.

8.1.2 Malpresentations

You will learn about obstructed labour in Study Session 9.

When the baby presents itself in the mother's pelvis in any position *other than* the vertex presentation, this is termed an abnormal presentation, or **malpresentation**. The reason for referring to this as 'abnormal' is because it is associated with a much higher risk of obstruction and other birth complications than the vertex presentation. The most common types of malpresentation are termed breech, shoulder, face or brow. We will discuss each of these in turn later. Notice that the baby can be 'head-down' but in an abnormal presentation, as in face or brow presentations, when the baby's face or forehead (brow) is the presenting part.

8.1.3 Malposition

You learned the directional positions: anterior/in front of and posterior/behind or in the back of, in the *Antenatal Care* Module, Part 1, Study Session 3.

Although it may not be so easy for you to identify this, the baby can also be in an abnormal *position* even when it is in the vertex presentation. In a normal delivery, when the baby's head has engaged in the mother's pelvis, the *back* of the baby's skull (the **occiput**) points towards the *front* of the mother's pelvis (the **pubic symphysis**), where the two pubic bones are fused together. This orientation of the fetal skull is called the *occipito-anterior* position (Figure 8.2a). If the occiput (back) of the fetal skull is towards the mother's back, this *occipito-posterior* position (Figure 8.2b) is a **vertex malposition**, because it is more difficult for the baby to be born in this orientation. The good thing is that more than 90% of babies in vertex malpositions undergo rotation to the occipito-anterior position and are delivered normally.

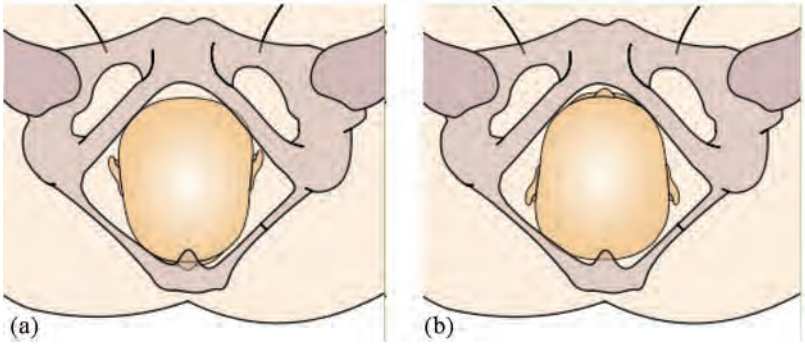


Figure 8.2 Possible positions of the fetal skull when the baby is in the vertex presentation and the mother is lying on her back: (a) The normal 'straight' occipito-anterior position in which the baby can be born most easily. (b) The 'straight' occipito posterior malposition makes birth more difficult. (Source: courtesy of Mikael Häggström, accessed from http://commons.wikimedia.org/wiki/File:Cephalic_presentation_-_straight_occipito-anterior.png)

Note that the fetal skull can also be tilted to the left or to the right in either the occipito-anterior or occipito-posterior positions.

8.2 Causes and consequences of malpresentations and malpositions

In the majority of individual cases it may not be possible to identify what caused the baby to be in an abnormal presentation or position during delivery. However, the general conditions that are thought to increase the risk of malpresentation or malposition are listed below:

- Abnormally increased or decreased amount of amniotic fluid
- A tumour (abnormal tissue growth) in the uterus preventing the spontaneous inversion of the fetus from breech to vertex presentation during late pregnancy
- Abnormal shape of the pelvis
- Laxity (slackness) of muscular layer in the walls of the uterus
- Multiple pregnancy (more than one baby in the uterus)
- Placenta previa (placenta partly or completely covering the cervical opening).

Multiple pregnancy is the subject of Section 8.7 of this study session. You learned about placenta previa in the *Antenatal Care* Module, Study Session 21.

If the baby presents at the dilating cervix in an abnormal presentation or malposition, it will more difficult (and may be impossible) for it to complete the *seven cardinal movements* that you learned about in Study Sessions 3 and 5. As a result, birth is more difficult and there is an increased risk of complications, including:

- Premature rupture of the fetal membranes (PROM)
- Premature labour
- Slow, erratic, short-lived contractions
- Uncoordinated and extremely painful contractions, with slow or no progress of labour
- Prolonged and obstructed labour, leading to a ruptured uterus (see Study Sessions 9 and 10 of this Module)
- Postpartum haemorrhage (see Study Session 11)

You learned about PROM in Study Session 17 of the *Antenatal Care* Module, Part 2.

- Fetal and maternal distress, which may lead to the death of the baby and/or the mother.

With these complications in mind, we now turn your attention to the commonest types of malpresentation and how to recognise them.

8.3 Breech presentation

In a **breech presentation**, the fetus lies with its buttocks in the lower part of the uterus, and its buttocks and/or the feet are the presenting parts during delivery. Breech presentation occurs on average in 3–4% of deliveries after 34 weeks of pregnancy.

■ When is the breech position the *normal* position for the fetus?

□ During early pregnancy the baby's bottom points down towards the mother's cervix, and its head (the largest part of the fetus at this stage of development) occupies the fundus (rounded top) of the uterus, which is the widest part of the uterine cavity.

8.3.1 Causes of breech presentation

You can see a transverse lie in Figure 8.7 later in this study session.

In the majority of cases there is no obvious reason why the fetus should present by the breech at full term. In practice, what is commonly observed is the association of breech presentation at delivery with a *transverse lie* earlier in the pregnancy, i.e. the fetus lies sideways across the mother's abdomen, facing a sideways implanted placenta. It is thought that when the placenta is in front of the baby's face, it may obstruct the normal process of inversion, when the baby turns head-down as it gets bigger during the pregnancy. As a result, the fetus turns in the other direction and ends in the breech presentation. Some other circumstances that are thought to favour a breech presentation during labour include:

- Premature labour, beginning before the baby undergoes spontanous inversion from breech to vertex presentation
- Multiple pregnancy, preventing the normal inversion of one or both babies

Polyhydramnios is pronounced 'poll-ee-hy-dram-nee-oss'. Hydrocephaly is pronounced 'hy-droh-keff-all-ee'

- Polyhydramnios: excessive amount of amniotic fluid, which makes it more difficult for the fetal head to 'engage' with the mother's cervix
- Hydrocephaly ('water on the brain') i.e. an abnormally large fetal head due to excessive accumulation of fluid around the brain
- Placenta praevia
- Breech delivery in the previous pregnancy
- Abnormal formation of the uterus.

8.3.2 Diagnosis of breech presentation

On abdominal palpation the fetal head is found above the mother's umbilicus as a hard, smooth, rounded mass, which gently 'ballots' (can be rocked) between your hands.

■ Why do you think a mass that 'ballots' high up in the abdomen is a sign of breech presentation? (You learned about this in Study Session 11 of the *Antenatal Care* Module.)

□ The baby's head can 'rock' a little bit because of the flexibility of the baby's neck, so if there is a rounded, ballotable mass above the mother's umbilicus it is very likely to be the baby's head. If the baby was 'bottom-up' (vertex presentation) the whole of its back will move of you try to rock the fetal parts at the fundus (Figure 8.3).

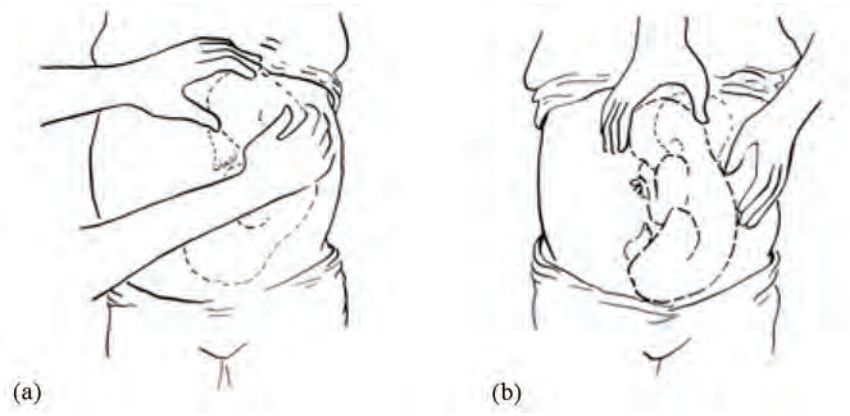


Figure 8.3 (a) The whole back of a baby in the vertex position will move if you rock it at the fundus; (b) The head can be 'rocked' and the back stays still in a breech presentation.

Once the fetus has engaged and labour has begun, the breech baby's buttocks can be felt as soft and irregular on vaginal examination. They feel very different to the relatively hard rounded mass of the fetal skull in a vertex presentation. When the fetal membranes rupture, the buttocks and/or feet can be felt more clearly. The baby's anus may be felt and fresh thick, dark meconium may be seen on your examining finger. If the baby's legs are extended, you may be able to feel the external genitalia and even tell the sex of the baby before it is born.

8.3.3 Types of breech presentation

There are three types of breech presentation, illustrated in Figure 8.4 on the next page. They are:

- **Complete breech** is characterized by flexion of the legs at both hips and knee joints, so the legs are bent underneath the baby.
- **Frank breech** is the commonest type of breech presentation, and is characterized by flexion at the hip joints and extension at the knee joints, so both the baby's legs point straight upwards.
- **Footling breech** is when one or both legs are extended at the hip and knee joint and the baby presents 'foot first'.

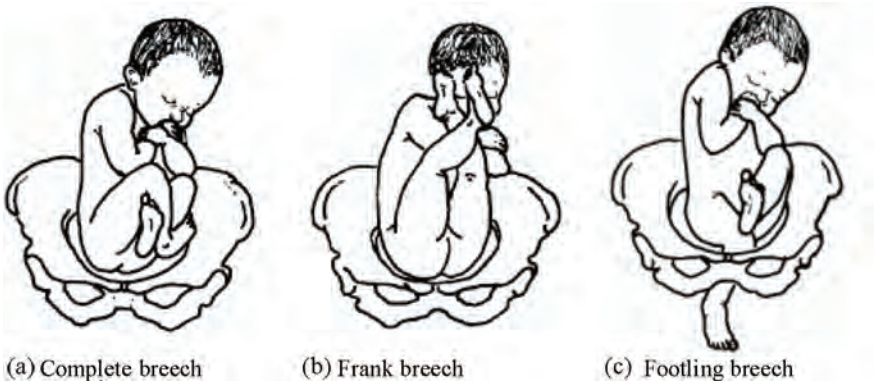


Figure 8.4 Different types of breech presentation. (Source: WHO, as in Figure 8.1)

8.3.4 Risks of breech presentation

Regardless of the type of breech presentation, there are significant associated risks to the baby. They include:

- The fetal head gets stuck (arrested) before delivery
- Labour becomes obstructed when the fetus is disproportionately large for the size of the maternal pelvis
- **Cord prolapse** may occur, i.e. the umbilical cord is pushed out ahead of the baby and may get compressed against the wall of the cervix or vagina
- Premature separation of the placenta (placental abruption)
- Birth injury to the baby, e.g. fracture of the arms or legs, nerve damage, trauma to the internal organs, spinal cord damage, etc.

Refer all cases of breech presentation to the nearest higher-level health facility.

Cord prolapse in a normal (vertex) presentation was illustrated in Study Session 17 of the *Antenatal Care* Module, and placental abruption was covered in Study Session 21.

A breech birth may also result in trauma to the mother's birth canal or external genitalia through being overstretched by the poorly fitting fetal parts.

■ What will be the effect on the baby if it gets stuck, the labour is obstructed, the cord prolapses, or placental abruption occurs?

□ The result will be **hypoxia**, i.e. it will be deprived of oxygen, and may suffer permanent brain damage or die.

You learned about the causes and consequences of hypoxia in the *Antenatal Care* Module.

8.4 Face presentation

Face presentation occurs when the baby's neck is so completely extended (bent backwards) that the occiput at the back of the fetal skull touches the baby's own spine (see Figure 8.5). In this position, the baby's face will present to you during delivery.

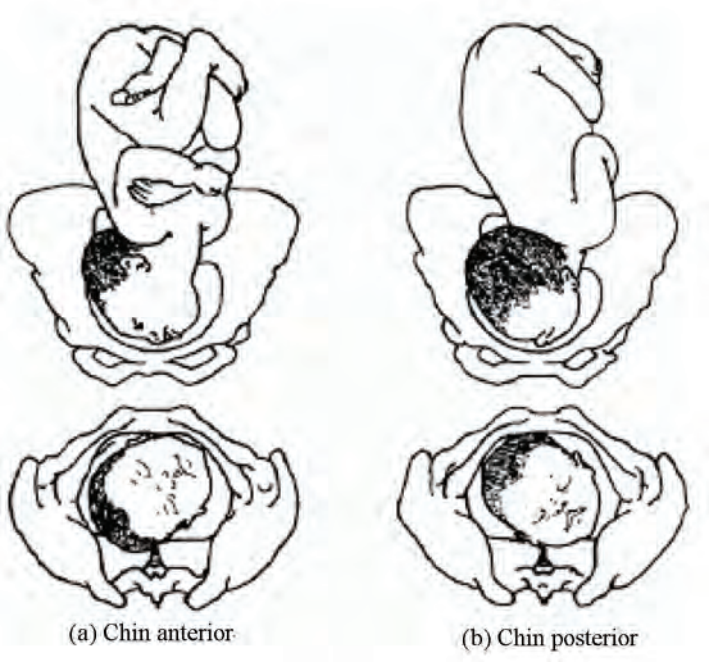


Figure 8.5 Face presentation. (a) The baby's chin is facing towards the front of the mother's pelvis; (b) the chin is facing towards the mother's backbone. (Source: WHO, as in Figure 8.1).

The incidence of face presentation is about 1 in 500 pregnancies in full term labours. In Figure 8.5, you can see how flexed the head is at the neck. Babies who present in the 'chin posterior' position (on the right in Figure 8.5) usually rotate spontaneously during labour, and assume the 'chin anterior' position, which makes it easier for them to be born. However, they are unlikely to be delivered vaginally if they fail to undergo spontaneous rotation to the chin anterior position, because the baby's chin usually gets stuck against the mother's sacrum (the bony prominence at the back of her pelvis). A baby in this position will have to be delivered by caesarean surgery.

Refer the mother if a baby in the chin posterior face presentation does not rotate and the labour is prolonged.

8.4.1 Causes of face presentation

The causes of face presentation are similar to those already described for breech births:

- Laxity (slackness) of the uterus after many previous full-term pregnancies
- Multiple pregnancy
- Polyhydramnios (excessive amniotic fluid)
- Congenital abnormality of the fetus (e.g. anencephaly, which means no or incomplete skull bones)
- Abnormal shape of the mother's pelvis.

8.4.2 Diagnosis of face presentation

Face presentation may not be easily detected by abdominal palpation, especially if the chin is in the posterior position. On abdominal examination, you may feel irregular shapes, formed because the fetal spine is curved in an 'S' shape. However, on vaginal examination, you can detect face presentation because:

- The presenting part will be high, soft and irregular.

- When the cervix is sufficiently dilated, you may be able to feel parts of the face, such as the orbital ridges above the eyes, the nose or mouth, gums, or bony chin.
- If the membranes are ruptured, the baby may suck your examining finger!

But as labour progresses, the baby's face becomes *oedematous* (swollen with fluid), making it more difficult to distinguish from the soft shape you will feel in a breech presentation.

8.4.3 Complications of face presentation

Complications for the fetus include:

- Obstructed labour and ruptured uterus
- Cord prolapse
- Facial bruising
- Cerebral haemorrhage (bleeding inside the fetal skull).

8.5 Brow presentation

In **brow presentation**, the baby's head is only partially extended at the neck (compare this with face presentation), so its brow (forehead) is the presenting part (Figure 8.6). This presentation is rare, with an incidence of 1 in 1000 deliveries at full term.

Figure 8.6 Brow presentation. (Source: WHO, as in Figure 8.1)

8.5.1 Possible causes of brow presentation

You have seen all of these factors before, as causes of other malpresentations:

- Lax uterus due to repeated full term pregnancy
- Multiple pregnancy
- Polyhydramnios
- Abnormal shape of the mother's pelvis.

8.5.2 Diagnosis of brow presentation

Brow presentation is not usually detected before the onset of labour, except by very experienced birth attendants. On abdominal examination, the head is high in the mother's abdomen, appears unduly large and does not descend into the pelvis, despite good uterine contractions. On vaginal examination, the presenting part is high and may be difficult to reach. You may be able to feel the root of the nose, eyes, but *not* the mouth, tip of the nose or chin. You may also feel the *anterior* fontanel, but a large *caput* (swelling) towards the front of the fetal skull may mask this landmark if the woman has been in labour for some hours.

Recall the appearance of a normal caput over the *posterior* fontanel shown in Figure 4.4 earlier in this Module.

8.5.3 Complications of brow presentation

The complications of brow presentation are much the same as for other malpresentations:

- Obstructed labour and ruptured uterus
- Cord prolapse
- Facial bruising
- Cerebral haemorrhage.

■ Which are you more likely to encounter — face or brow presentations?

□ Face presentation, which occurs in 1 in 500 full term labours. Brow presentation is more rare, at 1 in 1,000 full term labours.

8.6 Shoulder presentation

Shoulder presentation is rare at full term, but may occur when the fetus lies transversely across the uterus (Figure 8.7), if it stopped part-way through spontaneous inversion from breech to vertex, or it may lie transversely from early pregnancy. If the baby lies facing upwards, its back may be the presenting part; if facing downwards its hand may emerge through the cervix. A baby in the transverse position cannot be born through the vagina and the labour will be obstructed. Refer babies in shoulder presentation urgently.

Figure 8.7 Transverse lie (shoulder presentation). This baby cannot descend through the birth canal.

Do not attempt to turn a sideways lying baby. Unless a trained physician or midwife can turn the baby 'head down', it must be delivered by caesarean surgery.

8.6.1 Causes of shoulder presentation

Causes of shoulder presentation could be maternal or fetal factors.

Maternal factors include:

- Lax abdominal and uterine muscles: most often after several previous pregnancies
- Uterine abnormality
- Contracted (abnormally narrow) pelvis.

Fetal factors include:

- Preterm labour
- Multiple pregnancy
- Polyhydramnios
- Placenta previa.

■ What do ‘placenta previa’ and ‘polyhydramnios’ indicate?

□ Placenta previa is when the placenta is partly or completely covering the cervical opening. Polyhydramnios is an excess of amniotic fluid. They are both potential causes of malpresentation.

8.6.2 Diagnosis of shoulder presentation

On abdominal palpation, the uterus appears broader and the height of the fundus is less than expected for the period of gestation, because the fundus is not occupied by either the baby’s head or buttocks. You can usually feel the head on one side of the mother’s abdomen. On vaginal examination, in early labour, the presenting part may not be felt, but when the labour is well progressed, you may feel the baby’s ribs. When the shoulder enters the pelvic brim, the baby’s arm may prolapse and become visible outside the vagina.

8.6.3 Complications of shoulder presentation

Complications include:

- Cord prolapse
- Trauma to a prolapsed arm
- Obstructed labour and ruptured uterus
- Fetal hypoxia and death.

Remember that a shoulder presentation means the baby cannot be born through the vagina; if you detect it in a woman who is already in labour, refer her urgently to a higher health facility.

In all cases of malpresentation or malposition, do not attempt to turn the baby with your hands! Only a specially trained doctor or midwife should attempt this. Refer the mother so she and her baby can get emergency obstetric care.

8.7 Multiple pregnancy

In this section, we turn to the subject of **multiple pregnancy**, when there is more than one fetus in the uterus. More than 95% of multiple pregnancies are twins (two fetuses), but there can also be triplets (three fetuses), quadruplets (four fetuses), quintuplets (five fetuses), and other higher order multiples with a declining chance of occurrence. The spontaneous occurrence of twins varies by country: it is lowest in East Asian countries like Japan and China (1 out of 1000 pregnancies are *fraternal* or non-identical twins), and highest in black Africans, particularly in Nigeria, where 1 in 20 pregnancies are fraternal twins. In general, compared to single babies, multiple pregnancies are highly associated with early pregnancy loss and high perinatal mortality, mainly due to prematurity.

8.7.1 Types of twin pregnancy

Twins may be identical (monozygotic) or non-identical and fraternal (dizigotic). **Monozygotic twins** develop from a single fertilized ovum (the zygote), so they are always the same sex and they share the same placenta. By contrast, **dizygotic twins** develop from two different zygotes, so they can have

the same or different sex, and they have separate placentas. Figure 8.8 shows the types of twin pregnancy and the processes by which they are formed.

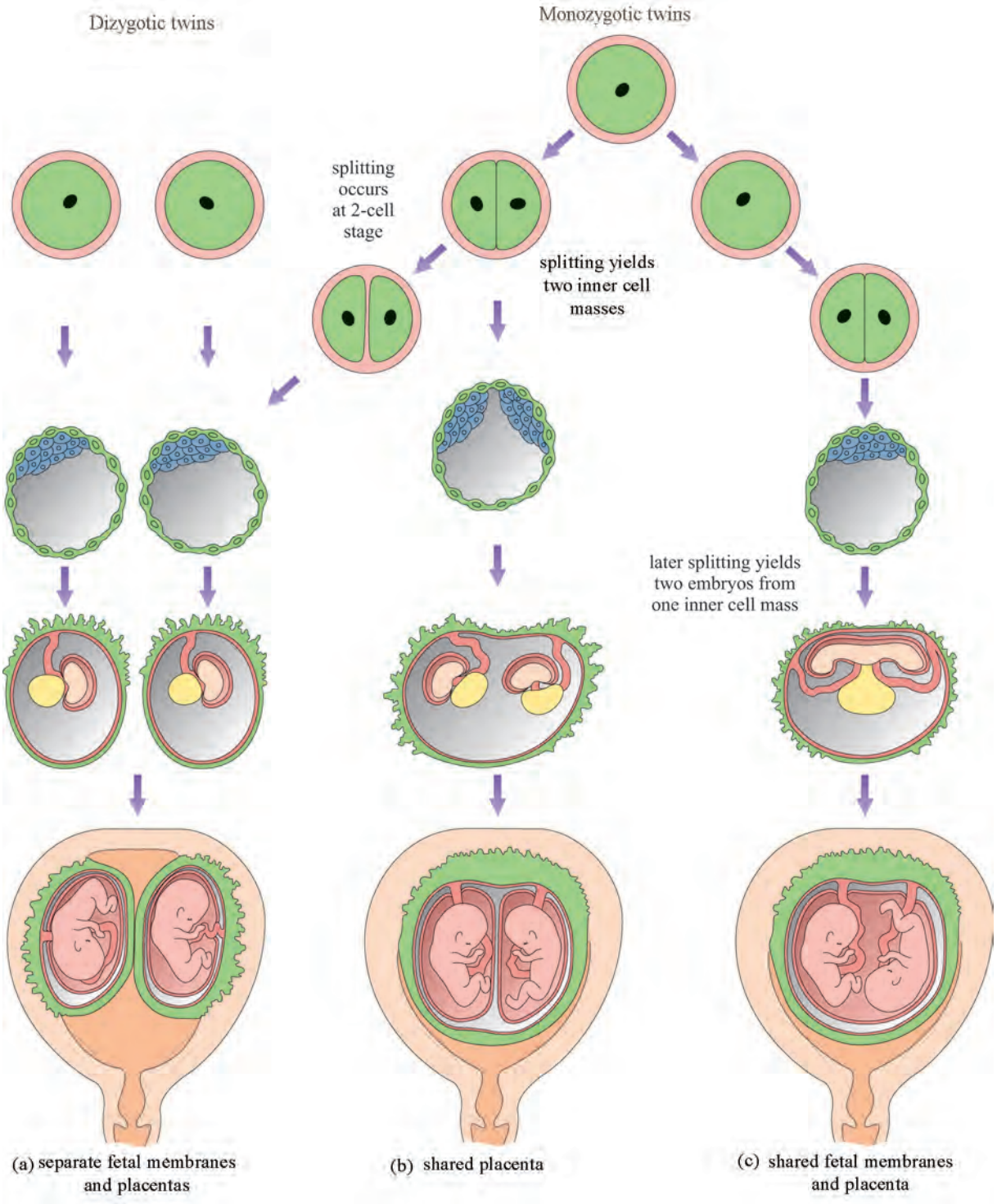


Figure 8.8 Types of twin pregnancy: (a) Fraternal or non-identical twins usually each have a placenta of their own, although they can fuse if the two placentas lie very close together. (b) Identical twins always share the same placenta, but usually they have their own fetal membranes.

8.7.2 Diagnosis of twin pregnancy

On abdominal examination you may notice that:

- The size of the uterus is larger than the expected for the period for gestation.
- The uterus looks round and broad, and fetal movement may be seen over a large area. (The shape of the uterus at term in a singleton pregnancy in the vertex presentation appears heart-shaped rounder at the top and narrower at the bottom.)
- Two heads can be felt.
- Two fetal heart beats may be heard if two people listen at the same time, and they can detect at least 10 beats different (Figure 8.9).
- Ultrasound examination can make an absolute diagnosis of twin pregnancy.

Figure 8.9 Two people can listen for twins, by tapping in rhythm with the two fetal heart beats.

8.7.3 Consequences of twin pregnancy

Women who are pregnant with twins are more prone to suffer with the minor disorders of pregnancy, like morning sickness, nausea and heartburn. Twin pregnancy is one cause of hyperemesis gravidarum (persistent, severe nausea and vomiting). Mothers of twins are also more at risk of developing iron and folate-deficiency anaemia during pregnancy.

■ Can you suggest why anaemia is a greater risk in multiple pregnancies?

□ The mother has to supply the nutrients to feed two (or more) babies; if she is not getting enough iron and folate in her diet, or through supplements, she will become anaemic.

Other complications include the following:

- Pregnancy-related hypertensive disorders like pre-eclampsia and eclampsia are more common in twin pregnancies.
- Pressure symptoms may occur in late pregnancy due to the increased weight and size of the uterus.
- Labour often occurs spontaneously before term, with premature delivery or premature rupture of membranes (PROM).
- Respiratory deficit (shortness of breath, because of fast growing uterus) is another common problem.

You will learn about low birth weight babies in detail in the *Postnatal Care* Module.

Twin babies may be small in comparison to their gestational age and more prone to the complications associated with low birth weight (increased vulnerability to infection, losing heat, difficulty breastfeeding).

- Malpresentation is more common in twin pregnancies, and they may also be 'locked' at the neck with one twin in the vertex presentation and the other in breech. The risks associated with malpresentations already described also apply: prolapsed cord, poor uterine contraction, prolonged or obstructed labour, postpartum haemorrhage, and fetal hypoxia and death.
- Conjoined twins (fused twins, joined at the head, chest, or abdomen, or through the back) may also rarely occur.

8.8 Management of women with malpresentation or multiple pregnancy

As you have seen in this study session, any presentation other than vertex has its own dangers for the mother and baby. For this reason, all women who develop abnormal presentation or multiple pregnancy should ideally have skilled care by senior health professionals in a health facility where there is a comprehensive emergency obstetric service. Early detection and referral of a woman in any of these situations can save her life and that of her baby.

- What can you do to reduce the risks arising from malpresentation or multiple pregnancy in women in your care?

- During focused antenatal care of the pregnant women in your community, at every visit after 36 weeks of gestation you should check for the presence of abnormal fetal presentation. If you detect abnormal presentation or multiple pregnancy, you should refer the woman *before* the onset of labour.

Summary of Study Session 8

In Study Session 8, you learned that:

1 During early pregnancy, babies are naturally in the breech position, but in 95% of cases they spontaneously reverse into the vertex presentation before labour begins.

2 Malpresentation or malposition of the fetus at full term increases the risk of obstructed labour and other birth complications.

3 Common causes of malpresentations/malpositions include: excess amniotic fluid, abnormal shape and size of the pelvis; uterine tumour; placenta praevia; slackness of uterine muscles (after many previous pregnancies); or multiple pregnancy.

4 Common complications include: premature rupture of membranes, premature labour, prolonged/obstructed labour; ruptured uterus; postpartum haemorrhage; fetal and maternal distress which may lead to death.

5 Vertex malposition is when the fetal head is in the occipito-posterior position — i.e. the back of the fetal skull is towards the mother's back instead of pointing towards the front of the mother's pelvis. 90% of vertex malpositions rotate and deliver normally.

6 Breech presentation (complete, frank or footling) is when the baby's buttocks present during labour. It occurs in 3–4% of labours after 34 weeks of pregnancy and may lead to obstructed labour, cord prolapse, hypoxia, premature separation of the placenta, birth injury to the baby or to the birth canal.

7 Face presentation is when the fetal head is bent so far backwards that the face presents during labour. It occurs in about 1 in 500 full term labours. 'Chin posterior' face presentations usually rotate spontaneously to the 'chin anterior' position and deliver normally. If rotation does not occur, a caesarean delivery is likely to be necessary.

8 Brow presentation is when the baby's forehead is the presenting part. It occurs in about 1 in 1000 full term labours and is difficult to detect before the onset of labour. Caesarean delivery is likely to be necessary.

9 Shoulder presentation occurs when the fetal lie during labour is transverse. Once labour is well progressed, vaginal examination may feel the baby's

ribs, and an arm may sometimes prolapse. Caesarean delivery is always required unless a doctor or midwife can turn the baby head-down.

10 Multiple pregnancies are always at high risk of malpresentation. Mothers need greater antenatal care, and twins are more prone to complications associated with low birth weight and prematurity.

11 Any presentation other than vertex after 34 weeks of gestation is considered as high risk to the mother and to her baby. *Do not attempt to turn a malpresenting or malpositioned baby!* Refer the mother for emergency obstetric care.

Self-Assessment Questions (SAQs) for Study Session 8

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the following questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 8.1 (tests Learning Outcomes 8.1, 8.2 and 8.4)

Which of the following definitions are true and which are false? Write down the correct definition for any which you think are false.

A Fundus — the 'rounded top' and widest cavity of the uterus.
B Complete breech — where the legs are bent at both hips and knee joints and are folded underneath the baby.
C Frank breech — where the breech is so difficult to treat that you have to be very frank and open with the mother about the difficulties she will face in the birth.
D Footling breech — when one or both legs are extended so that the baby presents 'foot first'.
E Hypoxia — the baby gets too much oxygen.
F Multiple pregnancy — when a mother has had many babies previously.
G Monozygotic twins — develop from a single fertilized ovum (the zygote). They can be different sexes but they share the same placenta.
H Dizygotic twins — develop from two zygotes. They have separate placentas, and can be of the same sex or different sexes.

SAQ 8.2 (tests Learning Outcomes 8.1 and 8.2)

What are the main differences between normal and abnormal fetal presentations? Use the correct medical terms in **bold** in your explanation.

SAQ 8.3 (tests Learning Outcomes 8.3 and 8.5)

(a) List the common complications of malpresentations or malposition of the fetus at full term.
(b) What action should you take if you identify that the fetus is presenting abnormally and labour has not yet begun?
(c) What should you *not* attempt to do?

SAQ 8.4 (tests Learning Outcomes 8.4 and 8.5)

A pregnant woman moves into your village who is already at 37 weeks gestation. You haven't seen her before. She tells you that she gave birth to twins three years ago and wants to know if she is having twins again this time.

(a) How would you check this?

(b) If you diagnose twins, what would you do to reduce the risks during labour and delivery?

Study Session 9 Obstructed Labour

Introduction

Obstructed labour is a totally preventable labour complication. One of your major roles as a skilled birth attendant is to prevent the occurrence of obstructed labour in women in your community. It is highly prevalent in the rural areas of Ethiopia, particularly among women who are in labour at home for a long time.

Obstructed labour is associated with a high **perinatal mortality and morbidity** (fetal and newborn deaths, and disease and disability occurring around the time of the birth). It contributes to 22% of the maternal mortality in Ethiopia. This shocking figure is certainly an underestimation of the problem, because deaths due to obstructed labour are often classified under other complications (such as sepsis, postpartum haemorrhage or ruptured uterus).

In this session, you will learn how to identify the clinical signs of prolonged and obstructed labours and determine the best management. Delayed management of obstructed labour often causes fistula in surviving women, which if not treated, may make them outcasts from their community for the rest of their lives.

Learning Outcomes for Study Session 9

When you have studied this session, you should be able to:

9.1 Define and use correctly all of the key words printed in **bold**. (SAQs 9.2 and 9.3)

9.2 List the main causes of obstructed labour and describe how each factor contributes to the development of this complication. (SAQ 9.1)

9.3 Describe the clinical signs of obstructed labour and the common maternal and fetal complications that result from uterine obstruction. (SAQ 9.3)

9.4 Describe the management of obstructed labour and ways of preventing it through your actions. (SAQ 9.3)

9.5 Explain how social changes at community level could affect the risk of obstructed labour occurring. (SAQ 9.4)

9.1 Defining obstructed labour

Obstructed labour is the failure of the fetus to descend through the birth canal, because there is an impossible barrier (obstruction) preventing its descent despite strong uterine contractions. The obstruction usually occurs at the pelvic brim, but occasionally it may occur in the pelvic cavity or at the outlet of the pelvis. When labour is prolonged because of failure to progress, there is a high risk that the descent of the fetus will become obstructed. There is no single definition of **prolonged labour**, because what counts as 'too long' varies with the stage of labour (see Box 9.1).

Box 9.1 When is labour classed as prolonged in the different stages of labour?

- **Prolonged latent phase of labour**: when true labour lasts for more than about 8 hours *without* entering into the active first stage.
- **Prolonged active phase of labour**: when true labour takes more than about 12 hours *without* entering into the second stage.
- **Prolonged second stage of labour:**
  - *Multigravida* mother: when it lasts for more than 1 hour.
  - *Primigravida* mother: when it lasts for more than 2 hours.

Although labour can be classed as 'prolonged' at any stage, you should note that obstructed labour most commonly develops after the labour has entered into the second stage.

9.2 Causes of obstructed labour

As indicated above, obstructed labour is generally a second stage phenomenon, in women whose labour is prolonged. Why labour becomes prolonged or obstructed may be due to one of the 'Ps' (as midwives and obstetricians call them): 'powers', 'passenger' and 'passage'.

- **Powers**: Inadequate power, due to poor or uncoordinated uterine contractions, is a major cause of prolonged labour. Either the uterine contractions are not strong enough to efface and dilate the cervix in the first stage of labour, or the muscular effort of the uterus is insufficient to push the baby down the birth canal during the second stage.
- **Passenger:** The fetus is the 'passenger' travelling down the birth canal. Prolonged labour may occur if the fetal head is too large to pass through the mother's pelvis, or the fetal presentation is abnormal.
- **Passage:** The birth canal is the passage, so labour may be prolonged if the mother's pelvis is too small for the baby to pass through or the pelvis has an abnormal shape, or if there is a tumour or other physical obstruction in the pelvis.

Table 9.1 (on the next page) summarizes the mechanical causes of 'passenger' and 'passage' failure.

Table 9.1 Causes of passenger and passage failures that lead to prolonged and possibly obstructed labours.

Passenger	Passage
Head: • Large fetal head (big for that pelvis) • Hydrocephalus (brain surrounded by fluid, which makes the skull swell) *Presentation and position*: • Brow, face, shoulder • Persistent malposition *Twin pregnancy*: • Locked twins (locked at the neck) • Conjoined twins (fused together with some shared organs)	*Bony pelvis*: • Contracted (due to malnutrition) • Deformed (due to trauma, polio) *Soft tissue*: • Tumour in the pelvis • Viral infection in the uterus or abdomen • Scars (from female circumcision)

The mechanical causes of prolonged and obstructed labour shown in Table 9.1 can be grouped into various categories: cephalopelvic disproportion; malpresentations and malpositions; or an abnormality in the fetus or the mother which obstructs the birth canal. We will look at each of these in turn in more detail.

9.2.1 Cephalopelvic disproportion (CPD)

Cephalic (pronounced 'seff-ah-lik') is from a Greek word meaning 'the head'. Disproportion tells you that the size of the fetal head is different from the size of the mother's pelvic brim.

Cephalopelvic disproportion (CPD) means it is difficult or impossible for the fetus to pass safely through the mother's pelvis due either to a maternal pelvis that is too narrow for that fetal head, or a large fetal head relative to that mother's pelvis (see Figure 9.1, and think back to the anatomy of the maternal pelvis and fetal skull which you learned in Study Session 6 of the *Antenatal Care* Module). The small (or contracted) pelvis in developing countries like Ethiopia is generally due to malnutrition in childhood persisting into adult life. Cephalopelvic disproportion cannot usually be diagnosed before the 37th week of pregnancy because before then the baby's head has not reached birth size.

9.2.2 Abnormal presentations and multiple pregnancies

Persistent *malpresentation* or *malposition* are other major causes of obstructed labour.

■ Can you distinguish between these two terms and recall some abnormal fetal presentations and malpositions from Study Session 8?

□ **Malpresentation** is any presentation other than *vertex* (the top of the baby's skull is the presenting part). The most common malpresentations are *breech* (the baby's buttocks and/or its feet present first), and *shoulder* when it engages 'shoulder first'. Malposition is when the baby is 'head down' (cephalic presentation), but the vertex is in the wrong position relative to the mother's pelvis. Two of the most common malpositions result in *face* and *brow* presentations.

Figure 9.1 Cephalopelvic disproportion: this woman's pelvis is too small for her baby's head.

You also learned about multiple pregnancies in Study Session 8. Labour can be obstructed by *locked twins* (the two babies are 'locked' together at their necks when the first twin is in breech presentation and the second twin is in

cephalic presentation), or *conjoined twins* (twins fused at the chest, head or any other site).

9.2.3 Fetal abnormalities

Some fetal abnormalities result in a fetus with an abnormally large head diameter, for example, *hydrocephalus,* which is due to excessive accumulation of fluid around the baby's brain.

9.2.4 Abnormalities of the reproductive tract

Female genital mutilation is the subject of Study Session 5 in the Module on *Adolescent and Youth Reproductive Health*.

A possible cause of obstructed labour is if the mother has a tumour (growth or swelling of tissue) in her pelvic cavity, or a scarred birth canal due to a severe type of female genital mutilation ('female circumcision'). Or she may have a tight perineum (the area between the vulva and the anus), which does not stretch in order to allow the baby to pass through.

9.3 Clinical signs of obstructed labour

A key sign of an obstructed labour is if the widest diameter of the fetal skull remains *stationary* above the pelvic brim because it is unable to descend. You should be able to detect this by careful palpation of the mother's abdomen as the uterus relaxes and softens between contractions. However, if the uterus has gone into *tonic contraction* (it is continuously hard) and sits tightly moulded around the fetus, it will be very difficult to feel whether the fetus is making any progress in the birth canal. Palpation will also be very painful for the woman**.** In this case you will have to rely more on other signs for your diagnosis, listed below.

9.3.1 Assessment of clinical signs of obstruction

Obstructed labour is more likely to occur if:

- The labour has been prolonged (lasting more than 12 hours)
- The mother appears exhausted, anxious and weak
- Rupture of the fetal membranes and passing of amniotic fluid was premature (several hours before labour began)
- The mother has abnormal vital signs: fast pulse rate, above 100 beats/minute; low blood pressure; respiration rate above 30 breaths/minute; possibly also a raised temperature.

You should assess a woman with this labour history by doing a vaginal examination. Any of the following additional signs would suggest the presence of obstruction:

- Foul-smelling meconium draining from the mother's vagina.
- Concentrated urine, which may contain meconium or blood.
- **Oedema** (swelling due to collection of fluid in the tissues) of the vulva (female external genitalia, including the labias), especially if the woman has been pushing for a long time. Vagina feels hot and dry to your gloved examining finger because of dehydration.
- Oedema of the cervix.
- A large swelling over the fetal skull can be felt (**caput**, Study Session 4).
- Malpresentation or malposition of the fetus.

- Poor cervical *effacement* (look back at Figure 1.1 in the first study session); as the result the cervix feels like an 'empty sleeve'.
- Bandl's ring may be seen (Figure 9.2).

9.3.2 Bandl's ring

Bandl's ring is the name given to the depression between the upper and lower halves of the uterus, at about the level of the umbilicus. It should not be seen or felt on abdominal examination during a normal labour (Figure 9.2a), but when it becomes visible and/or palpable (Figure 9.2b) Bandl's ring is a late sign of obstructed labour. Above this ring is the grossly thickened, upper uterine segment which is pulled upwards (retracted) towards the mother's ribs. Below the Bandl's ring is the distended (swollen), dangerously thinned, lower uterine segment. The lower abdomen can be further distended by a **full bladder** and gas in the intestines.

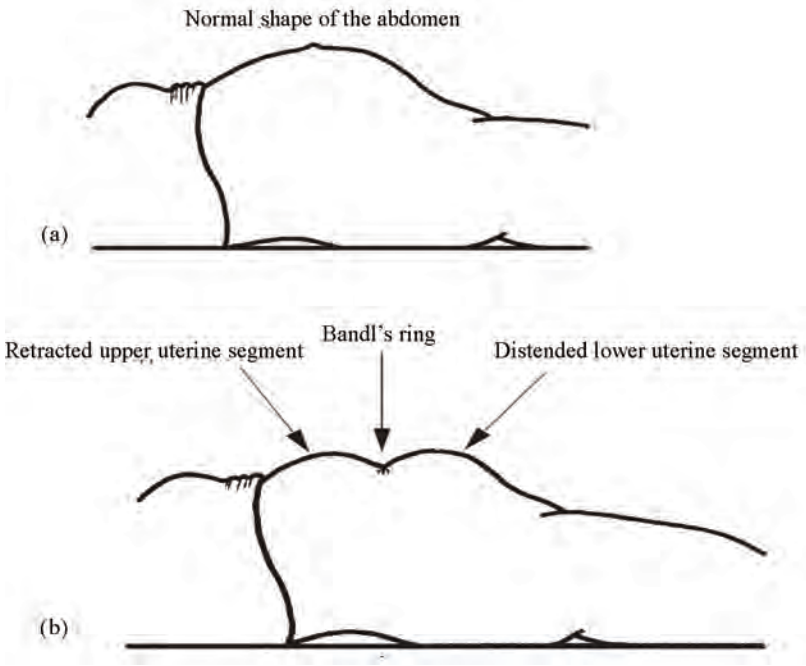


Figure 9.2 (a) Normal shape of pregnant abdomen during labour, in a woman lying on her back; (b) Bandl's ring in the abdomen of a woman with obstructed labour.

9.3.3 Evidence from the partograph

You will remember from Study Session 4 that the partograph is a key tool in detecting an abnormal or prolonged labour. Obstructed labour is revealed by recordings on the partograph of the rate of cervical dilatation (which, as you know, should progress at a rate of at least 1 cm per hour) and the rate of fetal head descent. Figure 9.3(a) shows a partograph record of a normal labour with progressive cervical dilatation and fetal head descent. However in Figure 9.3(b) you can quickly see that there is evidence of a prolonged first or second stage of labour because:

- the cervical dilatation measurement has crossed the 'Alert line' and if no action is taken it will cross the Action line, despite strong uterine contractions; the fetal head is not descending.

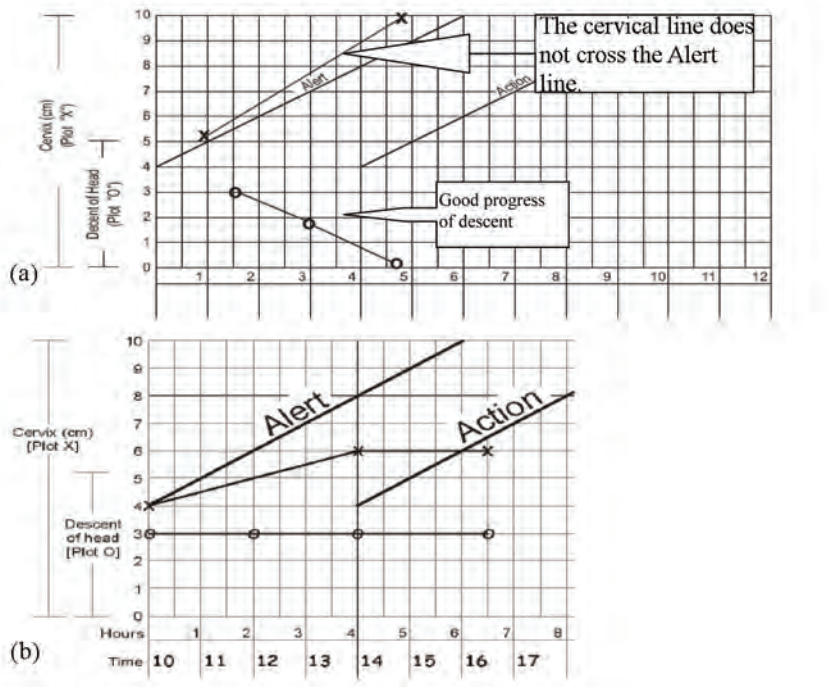


Figure 9.3 (a) Normal cervical dilatation and fetal head descent recorded on a partograph. (b) Cervical dilatation has stopped and the record line has crossed the Action line.

The cervical dilation record on the partograph should not cross the Alert and/or Action line. If this occurs you should consider this to be a prolonged and possibly obstructed labour and make an urgent referral.

■ In Figure 9.3(b), how many hours after recordings began on the partograph did cervical dilation stop progressing?

□ The cervix stopped dilating 4 hours after the partograph record began.

■ In the partograph shown in Figure 9.3(b), how much time has passed since there was any sign of cervical dilatation?

□ The partograph shows that there was no increase in cervical diameter for the previous two and a half hours.

9.4 Management of obstructed labour

There are several things that you can do to try to relieve the obstruction if the record of cervical dilatation reaches the Alert line on the partograph, and before it approaches the Action line. The details of these procedures were taught in the *Antenatal Care* Module (Study Session 22) and your practical skills training, so we will only refer briefly to them here.

- If the woman has signs of shock (fast pulse and low blood pressure), prepare to give her an intravenous infusion of Normal Saline or Ringer's Lactate to rehydrate her. Use a large (No. 18 or 20) cannula. Infuse her with 1 litre of fluids, with the flow rate running as quickly as possible, then repeat 1 litre every 20 minutes until her pulse slows to less than 90

beats per minute, and her diastolic blood pressure (when the heart relaxes after a beat) is 90 mmHg or higher.

- If you think the obstruction may be due to a very full bladder, prepare to drain it by inserting a catheter. Clean the perineal area and catheterize the mother's bladder to drain the urine into a closed container. Relieving this obstruction may be enough to allow the baby to be born. Note that catheterization of the bladder in a woman with obstructed labour is usually very difficult, because the urethra is also obstructed by the deeply engaged baby's head.
- Refer the mother urgently to a health facility where a surgical service is available (Figure 9.4). She may need emergency delivery by caesarean section (cutting open her abdomen and uterus) to get the baby out alive and also to save her life.

Figure 9.4 Don't delay in referring a woman whose labour may be obstructed.

9.5 Complications resulting from obstructed labour

The complications of uterine obstruction for the mother and for the fetus or newborn can be very serious. Remember that uterine obstructions happen mainly because of a prolonged labour at home that was not well managed and which was not referred quickly enough. The commonest complication affecting the mother is the formation of a fistula.

9.5.1 Fistula

Fistula is an abnormal opening (usually as a result of ruptured tissues) between the:

- Vagina and the urinary bladder
- Vagina and rectum
- Vagina and urethra (the tube bringing urine from the bladder to the opening in the vulva)
- Vagina and ureter (the tube bringing urine from each kidney to the bladder).

As a result of the fistula, urine or faeces get into the vagina and exit in an uncontrolled way. A woman with a fistual can leak urine or faeces while walking, or doing any daily activities, and the waste stains her clothes and creates a bad smell (Figure 9.5). Because of these effects, her husband and family may stigmatize her or make her an outcast. You can also imagine what

Figure 9.5 Fistula is one of the most distressing complications of obstructed labour.

continuously leaking urine or faeces means at a personal level. Other consequences of fistula may include constant depression, and many physical illnesses and infections of the reproductive tract, bladder and kidneys, which may even result in the woman taking her own life.

Obstructed labour is responsible for about 20% of all cases of fistula formation (see the research study reported in Figure 9.6).

Incidence = 0.20 × 0.25 × 0.20 = 0.001, or 1 per 1,000 deliveries

Figure 9.6 Clinical expert-based estimation of progression of prolonged labour to stillbirth and obstetric fistula development in high-risk sub-Saharan African countries (Source: Amy Tsui et al., The Gates Institute, Johns Hopkins Bloomberg School of Public Health, July 30, 2005)

Other rare causes of fistula are congenital malformation (abnormal communication, usually between the rectum and vagina, found at birth), infection (specifically tuberculosis), trauma, forceful sexual intercourse (rape), and early age sexual intercourse.

9.5.2 Other common complications of obstructed labour

To summarise briefly, unless it is well managed, obstructed labour can also lead to the following complications in the mother:

- Postpartum haemorrhage (you will learn about this in Study Session 11 in this Module)
- Slow return of the uterus to its pre-pregnancy size
- Shock (low blood pressure and fast pulse rate)
- The small intestine becomes paralyzed and stops movement (paralytic ileus)
- Sepsis (widespread infection throughout the body)
- Death.

You will learn in detail about complications affecting the newborn in the Modules on *Postnatal Care* and *Integrated Management of Newborn and Childhood Illness*

Complications of obstructed labour for the newborn can include:

- Neonatal sepsis
- Convulsions (fits)
- Facial injury
- Severe asphyxia (life-threatening lack of oxygen)
- Death.

9.6 Prevention of obstructed labour

There are several things that a skilled birth attendant can do to prevent a prolonged labour from becoming obstructed. Additionally, certain cultural changes would also make a significant difference to the circumstances that increase the risk of obstructed labour. We now look briefly at these factors.

9.6.1 Skilled birth attendance

As we said at the beginning, obstructed labour is a major cause of maternal death worldwide, and especially in developing countries like Ethiopia. The most important intervention that could prevent this toll of death and disability is having the services of a skilled attendant at the birth. So a really important part of your role as a rural health worker is to teach the people in your community (men as well as women) about the importance of getting skilled care at every delivery. Encourage the women to come to you for advice and maintain close links with the health centres or hospital (if there is one) in your area to facilitate quick and efficient referral in cases of emergency.

9.6.2 Using the partograph

The best diagnostic tool for identifying prolonged labour is to plot the stages of labour on the partograph, at the same time as regularly assessing fetal and maternal condition (see also Study Session 4). The partograph record will give you an early warning if labour may be prolonged to the point where an obstructed uterus seems likely and referral is essential. So always remember to use it when attending any delivery.

■ What are the two things you must do to minimise the chances of a woman who is in labour developing a fistula?

□ The two things you should do are:

- Closely monitor the progress of labour using the partograph to check that the record of cervical dilatation stays on or to the left of the Alert line.
- Urgently refer the mother to a health facility if she has an obstruction (the record of cervical dilatation is approaching the Action line on the partograph), with pre-referral IV fluid infusion or bladder catheterization if appropriate.

9.6.3 Birth preparedeness and complication readiness

As you learned in the *Antenatal Care* Module (Study Session 13), birth preparedness and complication readiness are the pillars of safer labour and delivery. So assist your community to organize themselves into birth preparedness teams, which have the leadership, knowledge, funding and transport to transfer mothers to the nearest health facility if there is an emergency such as obstructed labour.

9.6.4 Nutritional education

It is also important to intervene in the underlying factors that increase the risk of obstructed labour. As we said earlier, a major cause of obstructed labour is a small pelvis, which is mostly the result of poor nutrition during childhood persisting into adult life. Thus it is important to improve childhood nutrition through health education, especially for girls, to reduce the risk of prolonged and obstructed labour in later life.

9.6.5 Delaying early marriage

Another issue is early marriage. Researches in Ethiopia have shown that 50% of women, especially rural women, get married on average at around 16 years, and most of them rapidly become pregnant. This group of very young mothers is at especially high risk of obstructed labour because the pelvis has not

Early marriage is the subject of a study session in the Module on *Adolescent and Youth Reproductive Health*.

grown sufficiently to accommodate the baby's head. In your discussions with women, their partners and community leaders you can point out these risks of early marriage, and try to persuade them of the importance of delaying the first birth until after the woman is 18. As part of this, you will need to promote contraception (family planning methods) as a way of delaying the first pregnancy among these very young women. If unwanted pregnancy occurs, it is also important to counsel about safe abortion services (as described in the *Antenatal Care* Module, Part 2, Study Session 20).

Summary of Study Session 9

In Study Session 9 you have learned that:

1 Obstructed labour is failure of descent of the fetus through the birth canal (pelvis) because there is an impossible barrier (obstruction) preventing its descent in spite of strong uterine contractions.

2 Causes of obstructed labour are cephalopelvic disproportion (CPD), abnormal presentations, fetal abnormalities and abnormalities of the maternal reproductive tract.

3 Causes of prolonged labour are abnormality in one or more of the three 'Ps': power, passenger and passage.

4 The best diagnostic tool for you to identify prolonged labour is the partograph.

5 The clinical features of obstructed labour include mother stay in labour for more than 12 hours, exhausted and unable to support herself, deranged vital signs, dehydrated, Bandl's ring formation in the abdomen, bladder full above the symphysis pubis, big caput and big moulding, may be edematous vaginal opening.

6 Common maternal complications of obstructed labour include sepsis, paralytic ileus, postpartum haemorrhage, fistula formation.

7 Common fetal complications of obstructed labour are severe asphyxia, neonatal sepsis and death.

8 Early referral can save the life of the woman and the baby in case of obstructed labour.

Self-Assessment Questions (SAQs) for Study Session 9

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the following questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 9.1 (tests Learning Outcome 9.2)

Write down what you understand by the three 'Ps' and how they cause obstructed labour.

SAQ 9.2 (tests Learning Outcome 9.1)

Write down what you understand by the following terms:

(a) Perinatal mortality and morbidity
(b) Prolonged latent phase of labour
(c) Prolonged second stage of labour
(d) Malposition
(e) Caput.

SAQ 9.3 (tests Learning Outcomes 9.1, 9.3 and 9.4)

Read Case Study 9.3 and then answer the questions that follow it.

Case Study 9.1 Tadelech's story

Tadelech lives in Mekit Woreda. The journey from village to city can take days, and she lives far from even a health post. Tadelech is 25 years old and has already delivered two children safely in the village. This is her third pregnancy. Contractions started at 40 weeks of gestation. After two days of labour Tadelech is carried on a home-made stretcher to your health post. When you examine Tadelech, finds two swellings (masses) over the abdomen, with a depression between them at about the level of the woman's umbilicus (belly button). You also find that the baby's head is not engaged (it is just above the pelvic brim). On vaginal examination, you estimate that Tadelech's cervix is 8 cm dilated and the station of the fetal head is –3. Tadelech's vagina is hot and dry and she has oedema of the vulva.

(a) From the case study what signs do you find that indicate prolonged or obstructed labour?
(b) How do you manage Tadelech's condition?

SAQ 9.4 (tests Learning Outcome 9.5)

How can you reduce the risks of a prolonged and obstructed labour for women giving birth at home?

Study Session 10 Ruptured Uterus

Introduction

Ruptured uterus is a tearing or bursting of the uterus due to the pressure exerted by an obstructed labour. Uterine rupture is very prevalent in developing countries like Ethiopia, where around 94% of deliveries occur at home with no skilled health professional attending the labour. When labour ends with a ruptured uterus, the usual consequences for the woman (if she survives), are losing her baby and losing her uterus.

Almost all cases of uterine rupture occur among *multiparous* women, who have previously given birth at least once after their baby reached 28 weeks of gestation. You will find out why this is so later in this study session. Uterine rupture can also occur among women with a scarred uterus, if the scar tissue tears open. However, in Ethiopia and other developing countries, almost all cases of uterine rupture occur in women with an unscarred uterus whose labour became obstructed when noone was present to intervene. In this study session you will learn about the risk factors and clinical features of ruptured uterus, its consequences for the mother and the baby, and how to institute life-saving interventions.

Learning Outcomes for Study Session 10

When you have studied this session, you should be able to:

10.1 Define and use correctly all of the key words printed in **bold**. (SAQs 10.1 and 10.2)

10.2 Describe the predisposing factors for uterine rupture and explain why multiparous women are at greater risk than first-time mothers. (SAQ 10.2)

10.3 Describe the warning signs and clinical features of uterine rupture and the common complications that result from it. (SAQs 10.3 and 10.4)

10.4 Explain how you would perform life-saving interventions for women with a ruptured uterus, and what actions you would take to reduce the risk of uterine rupture during labour. (SAQ 10.4)

10.1 Predisposing factors for a ruptured uterus

The uterus of a woman in labour may rupture if the delivery is obstructed (for any reason) while the uterus continues contracting until it tears or bursts. You already know a lot about the complications of labour and delivery from Study Sessions 8 and 9, so you should be well prepared to answer the following question.

■ What factors can you suggest that would increase the risk of a ruptured uterus occurring?

□ Uterine rupture may occur if the labour is obstructed due to:

- **Cephalopelvic disproportion** (the fetal head is too large or the mother's pelvis is too small to allow the baby to descend down the birth canal).
- Persistent **malpresentation or malposition** of the fetus (e.g. breech, face, brow or shoulder presentation, or the baby is head down (vertex presentation) but in the occipito-posterior position (with the back of its skull towards the mother's back).

- **Multiple pregnancy** (twins or more babies, especially if they are 'locked' at the neck or conjoined/fused together).
- **Physical obstruction** preventing the baby from descending (e.g. a tumour in the abdomen or uterus).
- **Scarring** of the uterus (which we referred to in the introduction to this study session).

The first four causes have already been covered in detail in earlier study sessions, but there is more to be said about uterine scarring and some other reasons why uterine rupture may occur.

10.1.1 Uterine scarring

A woman who has had previous surgery on her uterus – for example, to deliver a baby by caesarean section, or to remove a uterine tumour – will be left with scar tissue where the severed uterine wall has healed. Scar tissue is less flexible than the intact wall of the uterus and it cannot stretch evenly during labour contractions. If the labour is obstructed for a long time, the powerful contractions of the muscle layer in the uterine wall may cause the scar tissue to tear open. Another reason for scarring of the uterus is if it was perforated during an abortion for a previous pregnancy.

10.1.2 Scarred cervix

The cervix may also have been damaged during a previous delivery, for example by forceps used to help deliver a baby that was failing to make progress after the head had crowned. Or cervical damage may have resulted if surgical instruments were inserted into the uterus via the vagina, for example to control postpartum haemorrhage, or to treat a problem in the uterus such as inflammation of the uterine lining. In any of these cases the injured cervix will develop scar tissue after healing that may burst open during an obstructed labour.

■ Do you recall from the *Antenatal Care* Module, what names are given to the muscle layer in the uterus and the inner lining of the uterus (where the placenta forms)?

□ The muscle layer is called the *myometrium*, and the inner lining is the *endometrium.*

10.1.3 Previously repaired fistula

You learned about fistula in Study Session 9. It is one of the most serious complications of obstructed labour and is highly prevalent in the rural areas of Ethiopia. If a woman developed a fistula during a previous labour, which was then surgically repaired, the scarring that developed as the fistula healed may have been so extensive that it obstructs the delivery of the next baby.

■ Which part of the birth canal will be scarred by a repaired fistula?

□ The vagina: a **fistula** is a torn opening between the vagina and either the urinary bladder, the rectum, the urethra or the ureter.

Women who are known to have a scarred uterus, cervix or vagina should be strongly advised to deliver their next baby in a health facility with a blood transfusion service and the surgical equipment and expertise to perform a caesarean delivery if the need arises.

10.2 Why are multiparous women more at risk of uterine rupture?

A **multiparous woman** is one who has previously given birth to at least one baby after 28 weeks of gestation. The gestational age is significant, because by 28 weeks the fetus will have reached a substantial size and weight, so the multiparous woman's uterus will already have been stretched. One result of this stretching is that the delivery is expected to be easier in subsequent pregnancies – which is, indeed, usually the case. Despite this fact, multiparous women are more likely than primiparous (first-time) mothers to experience uterine rupture if their labour is obstructed.

■ Can you suggest a reason for this unexpected finding?

□ One reason is that first-time mothers do not have a previous history of complicated delivery, whereas a woman who has given birth before may have already had complications which caused scarring of the uterus or other parts of the birth canal. Such scarring is a risk factor for a ruptured uterus.

10.2.1 Uterine inertia

Another reason why multiparous women with prolonged or obstructed labours are more at risk of uterine rupture relates to the fact that they continue experiencing powerful labour contractions for much longer than first-time mothers.

In primiparous women, the uterine contractions remain relatively strong only for about the first 24 hours of labour, after which the contractions become weaker in intensity and shorter in duration. After about 36 hours, in the majority of primiparous women, the uterus is exhausted and they develop **uterine** inertia, which is when the contractions become very weak in intensity, with a short duration and long intervals between them. For such first-time mothers, because uterine contractions have almost ceased, uterine rupture is a rare phenomenon. By contrast, the risk to multiparous women whose labour is obstructed is that the uterine contractions remain forceful and frequent for very much longer, and as a result the uterus is more likely to rupture.

Primiparous women do face other serious problems, however, because uterine inertia means that the fetal head will stay in the maternal pelvis for a long time. This increases the risk of fetal hypoxia (oxygen shortage), and fistula formation, retention of urine and infection in the obstructed bladder of the mother.

10.2.2 Traditional abdominal massage

In some parts of Ethiopia, **abdominal massage** during labour is a common cultural practice, particularly when labour is prolonged. Traditional birth attendants or village women use butter and other lubricants to rub the

abdomen and apply pressure on the fundus (rounded top) of the uterus to try to push the baby downwards. This is an extremely harmful traditional practice since it can lead to a ruptured uterus, especially in multiparous women (for the reasons given above).

10.2.3 Inappropriate use of uterotonic agents

Whenever you use a **uterotonic drug** (drugs that cause uterine contraction, e.g. misoprostol, oxytocin or ergometrine) for active management of the third stage of labour (recall Study Session 6), you *must* first check that there is no other fetus in the uterus. This is because if you mistakenly administer a uterotonic agent when there is still a fetus in the uterus, it will contract so powerfully that it can easily rupture, especially in the case of multiparous women. Also it is likely to asphyxiate the baby.

■ Why are multiparous mothers at greater risk of a ruptured uterus than primiparous women?

□ Scarring of the uterus is a major risk factor in uterine rupture, because scar tissue is less flexible and may tear open during contractions. A multiparous woman may have scars from a caesarean, or from a complicated earlier delivery which damaged the birth canal. Also, her uterus will go on contracting for a long time without developing uterine inertia, even if the labour is obstructed.

10.3 Clinical features and consequences of ruptured uterus

Uterine rupture is totally preventable if all cases of prolonged labour are managed effectively and appropriate action is taken before the uterus spontaneously ruptures.

10.3.1 Warning signs of imminent uterine rupture

Box 10.1 shows the common warning signs of imminent uterine rupture. These are the best indicators that the labour is obstructed and that, unless the baby is quickly delivered by surgical operation, the uterus is very likely to rupture soon.

Box 10.1 Warning signs of uterine rupture

- Frequent, strong uterine contractions, occurring more than 5 times in every 10 minutes, and/or each contraction lasting 60–90 seconds or longer.
- Fetal heart rate above 160 beats/minute, or below 120 beats/minute, persisting for more than 10 minutes – this is often the earliest sign of obstruction affecting the fetus.
- Bandl's ring formation (see Study Session 9 and Figure 10.1).
- Tenderness in the lower segment of the uterus.
- Possibly also vaginal bleeding.

Figure 10.1 A normal abdominal contour (left) and an obstructed uterus with Bandl's ring (right), indicating imminent risk of rupture.

■ How can the partograph aid you in spotting the potential imminence of uterine rupture?

□ Since you use it to chart the frequency and duration of contractions, as well as changes to the fetal heartrate, you will quickly see if either of these is in the warning zone indicated in Box 10.1 above.

10.3.2 Signs that the uterus has ruptured

The first sign that the uterus has ruptured is that the contractions stop completely. Other signs rapidly follow.

Tender swollen abdomen

Tenderness is pain elicited when you touch the abdomen. The abdomen is tender because of the rupture in the uterus and irritation caused by blood accumulating in the abdominal cavity. The abdomen appears distended (swollen) because the uterus is initially totally wrapped around the fetus and blood is escaping into the abdominal cavity. Bowel movement will be reduced or absent (paralytic ileus) so you will not be able to hear bowel sounds with your stethoscope. The bladder may also be obstructed, which contributes to the swelling and tenderness. As time passes, infection may develop in the abdomen, which will cause additional swelling.

Easily palpable fetal parts, absent movement and fetal heart sounds

The fetus cannot survive long in a ruptured uterus. After the initial wrapping of the uterus tightly around its body, parts of the fetus may emerge through the rupture, or the entire fetus may escape from the uterus into the abdominal cavity. When this happens, if you palpate the abdomen, only the abdominal wall will be between your hand and the fetus, so you will be able to feel the fetal parts easily. If the baby has died, the mother will not feel it moving, and you will not be able to hear a fetal heartbeat.

10.3.3 Consequences for the mother

The consequences of the rupture for the mother depend on the extent of the blood loss, how much time has passed since the rupture occurred, and whether her abdominal cavity and blood system are infected.

Extent of blood loss

Uterine rupture by its nature is a trauma to the uterine tissue where there will be tearing of uterine muscles and blood vessels. If the rupture involves major blood vessels, particularly uterine arteries, the blood loss will be massive. Unless rapid emergency intervention occurs, the blood loss will almost certainly cause the death of the fetus, and the mother will be in severe *haemorrhagic shock* (described below), which will be followed by her death.

If the rupture occurs in an area of the uterus where major blood vessels aren't involved, the woman has a greater chance of survival.

The duration of the rupture

It often happens that rural women, who are not haemorrhaging excessively and whose condition does not appear to them or their families to be immediately life-threatening, will remain at home for hours, even days, after the uterus has ruptured. However, the longer the woman remains untreated with a ruptured uterus, the higher the chance of greater blood loss, acute kidney failure and infection which has disseminated (spread) throughout her body.

Presence of established infection

A ruptured uterus means there is direct communication between the birth canal and the abdominal cavity. Other internal organs, including parts of the intestines, rectum and bladder may also have been damaged and be leaking their contents into the abdomen. As a result, microorganisms can easily spread around the whole of the abdominal cavity, and enter the blood circulation through the ruptured blood vessels. The development of infection in the abdominal cavity is called **peritonitis**; infection disseminated around the body in the blood circulation is called **septicaemia**. If the woman survives the initial rupture but remains untreated for more than about 6 hours, the risk of one or both of these conditions occurring is very high indeed. Therefore, early recognition that a rupture has occurred and early referral are of paramount significance in saving the life of the mother.

Depending on the extent of blood loss, duration of time since the rupture and status of any infection, the woman with a ruptured uterus may develop some or all of the complications described below.

Haemorrhagic shock

The signs of this rapidly fatal condition are that the mother has or feels:

- Faint, dizzy, weak or confused
- Pale skin and cold sweats
- Fast pulse (above 100 beats/minute) or too fast to be recordable
- Rapidly dropping or unrecordable blood pressure
- Fast breathing (above 30 breaths/minute)
- Sometimes loss of consciousness
- Significantly reduced or absent urine output.

Septic shock

This occurs if the rupture and haemorrhage have resulted in septicaemia. The signs are the same as for haemorrhagic shock, but with the addition of **high grade fever** (above 38^{o}C).

Other complications

- Peritonitis: infection in the abdominal cavity.
- Acute kidney failure due to low blood volume.

- Almost all cases coming to hospitals will be managed by removing the uterus (a hysterectomy), so the woman will be unable to have more children.

■ What happens to the fetus at the stage of an imminent ruptured uterus and immediately afterwards?

□ Before the rupture its heart rate is persistently above 160 beats/minute, or below 120 beats/minute. After the rupture the uterus wraps itself around the fetus, and with blood draining into the abdominal cavity, it quickly dies unless there is immediate surgery to remove it.

10.4 Interventions in ruptured uterus

The following guidelines will help you to prevent or reduce the risk of ruptured uterus occurring in labouring women in your community:

- Use the partograph to follow the progress of a woman in labour, to ensure you get early warning if the labour is not progressing normally (you learned how to use the partograph in Study Session 4 of this Module).
- Refer women quickly if you suspect the labour is prolonged or obstructed (see referral criteria below).
- Advise all multiparous women with a potentially scarred uterus (because of complications with an earlier birth) to deliver in a health facility with the capacity for blood transfusion and caesarean delivery. Give the same advice to any woman who has had a uterine tumour removed.
- Explain to community members why it is important *not* to massage the uterus during labour, or apply pressure on the uterus to try to hasten delivery; ask them not to do this even though it is a traditional practice.
- Use uterotonic drugs to help deliver the placenta, but only *after* checking that the last fetus has been delivered.

10.4.1 Referral criteria for prolonged labour

Do not allow a woman to remain for a long time in the first or second stages of labour without making an efficient referral.

■ When should you refer a multiparous or primiparous woman whose labour is prolonged? (Think back to Study Session 9.)

□ Referral for prolonged labour should happen for all women if:

- The latent first stage of labour lasts more than 8 hours before entering into the active first stage
- The active first stage lasts more than 12 hours before entering into the second stage
- The second stage of labour lasts more than one hour in a multiparous woman, or more than two hours in a primiparous woman, unless the birth of the baby seems to be imminent.

Your major role is **primary prevention** – in this case, making sure that if there is obstructed labour, you can get the woman to a health facility for emergency care in time to prevent uterine rupture. However, there are many reasons why you may have to give emergency care yourself to a woman with a ruptured uterus, where your role will be **secondary prevention** of the complications associated with uterine rupture.

10.4.2 Primary prevention: getting to a health facility for emergency care before uterine rupture

■ Think back to what you learned in the *Antenatal Care* Module (Study Session 13) and the discussion there about making a referral. What must you remember to do?

□ You should:

- Write a referral note with as much detail as possible.
- Mobilise the community's emergency transport plan for the mother. Go with her if you can.
- If possible, warn the health facility to expect her. If there is a choice of health facility at roughly equal distance, check which one has facilities for emergency surgery and blood transfusion and send her there.

10.4.3 Secondary prevention: emergency care for a woman in shock

A woman in shock needs help fast. You must treat her quickly to save her life.

Shock is an inevitable consequence of a ruptured uterus. So you refer her quickly to the nearest health facility with the necessary emergency care services. On the way, have the woman lie with her feet higher than her head, and her head turned to one side (Figure 10.2). Keep her warm and calm.

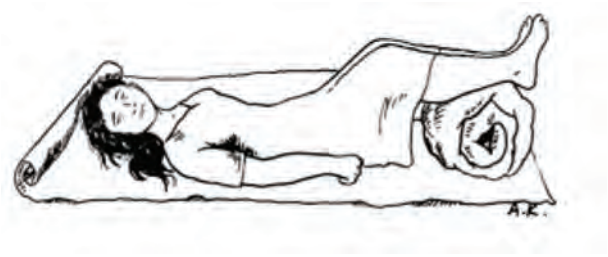


Figure 10.2 Position for transporting a woman in shock to hospital. Cover her with blankets to keep her warm.

If you have been trained to do so, begin to give her intravenous fluids. You learned how to do this in the *Antenatal Care* Module, Study Session 22, and in your practical skills training. If she is conscious, she can drink water or rehydration fluids (oral rehydration salts, ORS). If she is not conscious, do not give her anything by mouth - no medicines, drink or food.

Other important preparations that you should already have put in place are to:

- Ensure that your antenatal advice explained clearly to the woman the importance of having skilled help when she goes into labour
- Persuade the woman's family and her community to make a plan in advance for possible emergencies, including transport and financial support
- Make sure that you are well versed and skilled in making an early diagnosis and conducting pre-referral emergency procedures
- Make sure the woman goes to the health facility accompanied by at least two fit adult persons who can be potential blood donors, and go with her if you can.

Finally, try to reduce the possibility of any delay, which can mean the difference between life and death. The reasons why so many Ethiopian women die of a ruptured uterus are reluctance to seek skilled help at birth and then delay in seeking medical help following a rupture; further delay in getting

treatment because of distance to a health facility; or lack of equipment and appropriately trained personnel when the woman arrives for emergency care.

If you remember all these points you will have the best possible chance of ensuring that the woman is quickly referred to the most appropriate facility for emergency intervention and care.

Summary of Study Session 10

In Study Session 10 you have learned that:

1 In Ethiopia, uterine rupture most often occurs because of neglected obstructed labour. With early intervention and appropriate care, uterine rupture is almost entirely preventable.

2 More cases of uterine rupture occur among multiparous women than among primiparous women. One reason is that in primiparous woman uterine intertia acts to prevent contractions remaining forceful and frequent for such a long time that uterine rupture occurs.

3 Uterine inertia in primiparous women has other risks: because the fetal head stays in the pelvis for a long time there is increased risk of fetal hypoxia, fistula formation, retention of urine and infection of the bladder.

4 The main predisposing factor for uterine rupture is an obstructed labour, which may be due to cephalopelvic disproportion, malpresentation/ malposition of the fetus, multiple pregnancy, a uterine tumour, or scarring. Other factors increasing the risk of rupture include a previously repaired fistula, injudicious use of uterotonic drugs, and abdominal massage during labour by traditional healers.

5 The clinical features of imminent uterine rupture are persistent uterine contractions of 60–90 seconds duration or longer, occurring more than 5 times in every 10 minutes, fetal heartbeat derangement (persistently above 160 beats/minute or below 120 beats/minute), Bandl's ring formation, abdominal tenderness, and maybe vaginal bleeding.

6 The key sign that a uterus has ruptured is that contractions stop completely.

7 Other signs of a ruptured uterus may include abdominal tenderness, easily palpable fetal parts, abdominal distension, absence of fetal kick and absence of fetal heartbeat.

8 The clinical condition of a woman with a ruptured uterus depends on the extent of blood loss, duration of rupture and presence of established infection.

9 Common complications of uterine rupture are fetal death, maternal death, infection and haemorrhagic and/or septic shock, peritonitis, acute kidney failure, and surgical removal of the uterus

10 Some reasons why so many Ethiopian women die of a ruptured uterus are: reluctance to seek skilled help at birth and then delay in seeking medical help following a rupture; further delay in getting treatment because of distance to a health facility; or lack of equipment and appropriately trained personnel when the woman arrives for emergency care.

Self-Assessment Questions (SAQs) for Study Session 10

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the following questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 10.1 (tests Learning Outcomes 10.1 and 10.2)

What are the main factors that may predispose a woman to develop a uterine rupture?

SAQ 10.2 (tests Learning Outcomes 10.1 and 10.2)

Why are multiparous women at greater risk of uterine rupture than primiparous women?

SAQ 10.3 (tests Learning Outcome 10.3)

Complete Table 10.1 below by adding details of the warning signs of a possible uterine rupture.

Table 10.1 Warning signs of possible uterine rupture.

Actions	**Warning signs**
Timing the stages of labour	
Timing the uterine contractions	
Checking the fetal heart rate	
Checking the abdomen	

SAQ 10.4 (tests Learning Outcomes 10.3 and 10.4)

(a) What complications may follow uterine rupture?
(b) What actions should you take if uterine rupture occurs?

Study Session 11 Postpartum Haemorrhage

Introduction

Worldwide, every year, an estimated 127,000 women die as a result of blood loss following labour and delivery. It is the world's leading cause of maternal mortality, accounting for a quarter of all maternal deaths. In total there are 14 million cases of haemorrhage occurring every year in association with pregnancy and childbirth, the majority of which are because failure of the uterus to contract properly after delivery of the placenta results in heavy bleeding or **postpartum haemorrhage**. In Study Session 6 you learned about the management of the third stage of labour, which begins with delivery of the baby and ends with delivery of the placenta and fetal membranes.

In this study session, you will learn about postpartum haemorrhage (PPH) and its management. PPH is one of the most alarming and serious emergencies in childbirth and your rapid actions can save many lives. Do not forget that **antepartum haemorrhage** (excessive bleeding *before* labour begins) can also threaten the life of the mother and fetus. You learned about early and late pregnancy bleeding in Study Sessions 20 and 21 of the *Antenatal Care* Module.

■ Can you recall the two most common causes of late pregnancy bleeding?

□ They are: **placenta previa**, when the placenta is close to or covering the cervix and it tears away as the cervix begins to efface and dilate as labour begins; and **placental abruption**, when the placenta is situated normally in the top two-thirds of the uterus, but it detaches before the birth of the baby.

Learning Outcomes for Study Session 11

When you have studied this session you should be able to:

11.1 Define and use correctly all of the key words printed in **bold**. (SAQ 11.1)

11.2 Describe the causes and risk factors for atonic and traumatic postpartum haemorrhage. (SAQ 11.2)

11.3 Describe interventions that can help to prevent postpartum haemorrhage, including actions during pregnancy and labour stages two and three. (SAQ 11.3)

11.4 Explain how you would provide emergency management for women who develop postpartum haemorrhage. (SAQ 11.3)

11.1 What is postpartum haemorrhage?

Postpartum haemorrhage (or **PPH**) is defined as excessive bleeding from the reproductive tract at any time following the baby's birth and up to six weeks after delivery. Some 70–90% of PPH cases occur within the first 24 hours after delivery and are due to failure of the uterus to contract properly after the placenta detaches. Firm uterine contraction is necessary to close off the torn blood vessels in the placental bed.

Risk factors are existing underlying conditions which make a condition more likely to happen or more dangerous.

PPH is an *unpredictable* and *rapid* cause of maternal death. It is unpredictable in that two-thirds of women who develop PPH have none of the known **risk factors** (doctors refer to an adverse condition as *idiopathic* if there is no known reason why it occurred). In other cases, a woman with PPH does have one or more of the known risk factors (we review them later in this study session), or the PPH is due to mismanagement of the third stage of labour by the healthcare provider.

11.1.1 How much bleeding is 'excessive'?

You learned how to measure blood pressure and pulse in Session 9 of the *Antenatal Care* Module; the causes and management of haemorrhagic shock were covered in Sessions 20–22 of that Module.

In normal births, the mother usually loses a small amount of blood (about 150 ml or a cupful) as the baby is born and after delivery of the placenta. When the amount exceeds 300 ml (2 cupfuls) it is considered as heavy bleeding (Figure 11.1). **Excessive bleeding** is often defined as more than 500 ml of blood loss. However, for severely anaemic women, blood loss of even 200–250 ml can be fatal. For that reason, a better definition of postpartum haemorrhage might be 'any amount of bleeding that causes deterioration in the woman's condition and signs of haemorrhagic shock', i.e. low blood pressure, fast pulse, pallor, weakness or confusion).

Figure 11.1 Heavy bleeding is more than 300 ml; excessive bleeding is more than 500 ml.

11.1.2 Classification of postpartum haemorrhage

Postpartum haemorrhage can be classified based upon the *timing* of the bleeding following delivery of the baby and the *cause* of the bleeding.

Classifications based on the timing of bleeding are:

- **Primary postpartum haemorrhage** is excessive bleeding occurring during the third stage of labour, or within 24 hours of delivery.
- **Secondary postpartum haemorrhage** (also known as **late postpartum** haemorrhage) includes excessive bleeding occurring between 24 hours after delivery of the baby and 6 weeks postpartum.

Classifications based on the *cause* of the bleeding are termed either *atonic* or *traumatic* PPH. We will discuss each of these and their management in the next two sections.

11.2 Atonic postpartum haemorrhage

The word 'atonic' means 'loss of muscular tone or strength to contract'. **Atonic postpartum haemorrhage** is characterized by excessive bleeding when the uterus is not well contracted after the delivery, and is soft, distended and lacking muscular tone.

More precisely, in atonic PPH, the **myometrium** (the muscle layer in the wall of the uterus) fails to contract and compress the maternal blood vessels that tear as the placenta pulls away from the wall of the uterus. Most bleeding after birth comes from the place where the placenta was previously attached. If the myometrium fails to constrict strongly, it cannot compress the blood vessels to control the bleeding.

11.2.1 Causes of atonic PPH

Any condition that interferes with uterine contraction, such as a retained placenta, remnants of placental tissue, or retained amniotic membranes or blood clots, increases the risk of excessive bleeding. If the placenta has separated but is still, even partially, in the uterus, it can prevent the uterus from contracting. Even a small piece of placenta or a blood clot left inside the

uterus can keep it in the atonic condition. When the uterus is not contracted, the mother's blood vessels continue to pump blood out and the woman will quickly lose blood.

The real problem with atonic PPH is that you cannot predict who will bleed excessively after the birth, and this is because two-thirds of women who develop atonic PPH have no known risk factors. This is why it is important to remember that *all* women must be considered at risk and prevention of PPH must be a part of every birth. The most important known risk factors are summarized below.

Interference with the ability of the uterus to contract

Note that while you cannot *prevent* an atonic uterus from occurring (nor can you always predict it), knowing the factors that make it more likely will help you to be alert to these possible signs of atonic PPH:

- *Placenta previa or placental abruption*: in both conditions the muscle fibres in the myometrium are damaged at the placental site.
- **Retained placenta**: this is when the whole or part of the placenta remains inside the uterus, interfering with the normal muscular contraction at the placental site.
- **Incomplete separation of the placenta**: this is when part of the placenta has separated from the uterine wall and part of it remains attached.
- *Full bladder*: the structural closeness of the uterus and the bladder means that a full bladder can interfere with the normal uterine contractions throughout labour and after delivery.
- **High parity**: this refers to a woman who has had more than five pregnancies; the muscles of the myometrium can lose their strength to contract firmly, due to repeated stretching.
- *Multiple pregnancy*: causes the uterus to increase its size to accommodate two or more babies (Study Session 10); following their delivery, the overstretched uterus may take a long time to contract firmly.
- *Polyhydramnios*: an excessive amount of amniotic fluid surrounding the baby (more than 3 litres) can overstretch the uterus in the same way as multiple pregnancy.
- *Large baby:* (over 4.0 kilograms) can also overstretch the uterus.
- *Prolonged labour*: when the labour extends more than 12 hours (Study Session 9), the muscles of the myometrium can become so exhausted by repeated contraction that they can no longer contract properly (*uterine inertia*).

Anaemia in the mother

Anaemia (lack of red blood cells due to low haemoglobin) puts the mother at greater risk of postpartum haemorrhage, because her blood does not clot as easily as in a non-anaemic person. Blood loss is also more serious in someone with anaemia. (You learned about the diagnosis and management of anaemia during pregnancy in Study Session 18 of the *Antenatal Care* Module.)

Mismanagement of the third stage of labour

Study Session 6 described how active management of delivery of the placenta should be conducted and what actions should be avoided.

- What is the name given to the correct method of actively assisting delivery of the placenta?

- It is called **controlled cord traction**.

- What *incorrect* actions by the birth attendant during the third stage could result in postpartum haemorrhage?

- Trying to deliver the placenta before it separates; pushing down on the fundus of the uterus while pulling on the umbilical cord; not waiting for a contraction before applying controlled cord traction and/or not applying counter-pressure to the mother's abdomen. (Read Study Session 6 again if you are unsure of the steps in controlled cord traction.)

11.3 Traumatic postpartum haemorrhage

In **traumatic postpartum haemorrhage**, excessive bleeding occurs as a result of **trauma** (injury) to the reproductive tract following delivery of the baby. Trauma can occur to the cervix, vagina, perineum or anus. It could also be from a ruptured uterus (see Study Session 10). Signs of traumatic postpartum haemorrhage are when there is bleeding from the vagina but the uterus is well contracted (hard).

Trauma to the reproductive tract is preventable through skilled and gentle management during delivery, and referring the mother in good time if the labour is prolonged, or if the fetus is in an abnormal presentation or malposition (Study Session 8).

11.4 Reducing the risk of postpartum haemorrhage

In this section we briefly review the actions you can take at different stages to reduce the risk of postpartum haemorrhage occurring – beginning with a pregnant woman before labour starts.

11.4.1 Interventions during antenatal care

You should arrange for women with known risk factors (as described above for atonic PPH) to give birth in a health facility, where the risk of PPH can be more easily managed and urgent action taken if it occurs. In some cases (e.g. of placenta previa, malpresentation or twins), the baby may have to be delivered by caesarean surgery. There are many reasons why women may not want to go to a health facility, and it is important that you explain clearly and sensitively to mothers who are at increased risk why it is not safe for them to give birth at home. If they refuse, make sure that an emergency referral plan is in place and that potential blood donors are ready in case the woman needs a blood transfusion.

The high risk of PPH associated with anaemia is one reason why you should screen routinely for anaemia at every antenatal (and postnatal) visit, and take action to prevent it.

■ What should you do to prevent anaemia in the pregnant women in your care?

□ Counsel them on good nutrition with a focus on available iron-rich and folate-rich foods (e.g. dark green leafy vegetables, whole grains, red meats, eggs) and provide iron/folate supplements.

You learned how to do this in the *Antenatal Care* Module as part of focused antenatal care (Study Session 13), nutrition in pregnancy (Study Session 14), and the prevention and treatment of anaemia (Study Session 18).

■ What actions should you take to prevent anaemia caused by malaria and hookworm?

□ Encourage the use of insecticide-treated bed nets as protection against being bitten by the mosquitoes that transmit the malaria parasite. Provide treatment (mebendazole) after the first trimester of pregnancy in areas of high hookworm prevalence.

Malaria and hookworm are covered in detail in the *Communicable Diseases* Module.

11.4.2 Interventions during the second stage of labour

- Use a partograph to monitor and manage labour and prevent prolonged labour (see Study Session 4 of this Module).
- Encourage the woman to keep her bladder empty.
- Do not encourage pushing before the cervix is fully dilated.
- Do not apply fundal pressure (pressing on the top of the uterus) to assist the birth of the baby.
- Assist the woman in the controlled delivery of the baby's head and shoulders to prevent tears (see Study Session 3 of this Module). Place the fingers of one hand against the baby's head to keep it flexed (bent), support the perineum with the other hand, and teach the woman breathing techniques to push or to stop pushing.

11.4.3 Interventions during and after the third stage of labour

For women with no known risk factors, you can reduce the risk of PPH by correct and careful management of the third stage of labour, as described in Study Session 6. In summary, the main points to remember are as follows:

- After delivering the baby (and checking that there is no other baby left behind in the uterus), give the woman misoprostol 600 µg (micrograms) by mouth, or oxytocin 10 IU (international units) by intramuscular injection to help the uterus to contract.
- Do not apply fundal pressure to assist the delivery of the placenta.
- Rub the uterus immediately after the placenta is delivered, and at least every 15 minutes for the first 2 hours after birth to keep the uterus well-contracted. Teach the woman to massage and check her own uterus to keep it firm, and tell her to call for assistance if it is soft or if bleeding increases (Figure 11.2, on the next page).

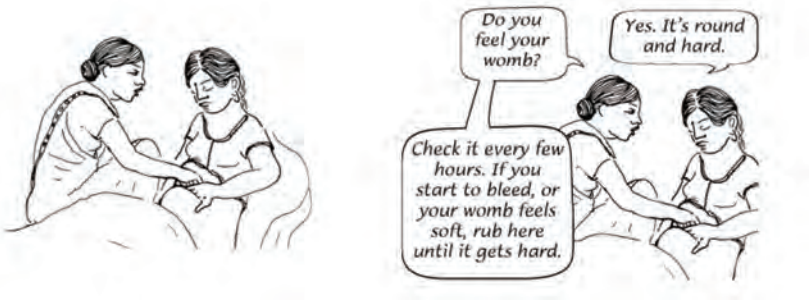


Figure 11.2 Rubbing the uterus helps to stimulate uterine contraction after placental delivery.

- Do a careful inspection for lacerations of the vagina, perineum and anus.
- Do a careful inspection of the placenta to ensure that it is intact (Study Session 6 showed how to do this).
- Help the mother to breastfeed the baby immediately after it is born – even before the placenta has delivered (Figure 11.3). When the baby sucks, the mother's body makes its own oxytocin, which stimulates the uterus to contract at the same time as it stimulates the milk ducts to contract and let down milk into the baby's mouth. Breastfeeding helps to deliver the placenta and reduce postpartum bleeding.

Figure 8.3 Breastfeeding immediately after the birth helps to reduce postpartum bleeding, as well as bonding the mother and baby.

You learned the principles of urinary catheterization in Study Session 22 of the *Antenatal Care* Module and your practical skills training.

- Encourage the woman to empty her bladder immediately after the birth. The uterus may stay soft because the mother's bladder is full. If she cannot urinate help her by trickling warm water over her abdomen. If this does not work, she may need to have a catheter (a plastic tube) put into her bladder to help her urinate.

■ There are interventions you can make before, during and after labour which may help to reduce the risk of PPH. Quickly see how many of these you can list.

□ To check how well you answered, re-read Sections 11.4.1, 11.4.2 and 11.4.3 of this study session.

However, remember that even if you make all the interventions possible, postpartum haemorrhage can still occur unpredictably after *any* delivery and you should always be prepared to take emergency action, as described next.

11.5 Emergency management of postpartum haemorrhage

If the mother begins to bleed excessively after the delivery, you must take action quickly to transport her to the nearest health facility. Postpartum haemorrhage can kill her and many healthcare providers underestimate how much blood a woman loses. If you face such a problem your first action should be to shout for help so the woman's family or neighbours come to help you take her to the nearest health facility (Figure 11.4).

Figure 11.4 Do not delay in referring a woman with postpartum haemorrhage.

11.5.1 Uterotonic drugs and IV fluids to manage atonic PPH

If the mother is bleeding heavily, while you are waiting for the emergency transport, give her a second dose of oxytocin 10 IU by intramuscular injection, or a second dose of misoprostol 400 µg rectally (by pushing the tablets gently into the rectum through the woman's anus), or by putting the tablets under her tongue where they can slowly dissolve. Do not give additional misoprostol if oxytocin was the drug used originally.

> Do not exceed 1,000 µg of misoprostol! If you gave 600 µg orally straight after the baby was born, the second dose should be no more than 400 µg rectally.

If you have been trained to do so, begin pre-referral infusion of intravenous (IV) fluids to prevent and treat shock. Infuse Normal Saline 9% or Ringer's Lactate solution, set with the fastest possible flow rate. Ensure that the bag of IV solution is held higher than the woman's head all the time, including when she is being transported to the nearest health facility.

You learned the principles of IV fluid infusion in Study Session 22 of the *Antenatal Care* Module and your practical skills training.

11.5.2 Use two-handed pressure on the uterus

If bleeding is very heavy and rubbing the uterus does not stop the bleeding, try two-handed pressure on the uterus (see Figure 11.5). Scoop up the uterus, fold it forward, and squeeze it hard (you will be shown how to do this in your practical skills training). Cup one hand over the top of the uterus. Put your other hand above the pubic bone and push the uterus towards your cupped hand. You should be squeezing the uterus between your two hands.

If you have been trained to do so, you can apply two-handed uterine compression by inserting one gloved hand inside the vagina and clenching your hand behind the cervix, while the other hand is pressing on the abdomen to compress the uterus.

Figure 11.5 Two-handed pressure over the uterus can help to stop postpartum bleeding.

As soon as the bleeding slows down and the uterus feels firm, slowly stop the two-hand pressure. If bleeding continues, refer the woman to the nearest health centre facility. Try to keep two-handed pressure on the uterus while you are transporting the mother. Do not leave the baby behind – have someone carry it. Make sure you take possible blood donors from her relatives with you as the woman may need a blood transfusion.

11.5.3 Emergency management for traumatic PPH

Try to slow the bleeding from an injury (e.g. a tear in the perineum or vagina) by applying pressure over the source of the haemorrhage. Roll up 10 to 15 pieces of sterile gauze or a small, sterile cloth into a thick pad and push it firmly against the bleeding part of the tear. Hold it there for 10 minutes. Carefully remove the gauze and check for bleeding. If the tear is still bleeding, press the gauze against the source of the haemorrhage again and take the woman to the nearest health facility. Do not stop pressing on the tear until you get to there. If the woman has a long or deep tear, even if it is not bleeding much, take her to a health facility where it can be repaired.

11.6 A checklist for emergency referral

Finally, as we come to the end of this Module on *Labour and Delivery Care*, Table 11.1 summarises some key points to remember during emergency referral for postpartum haemorrhage, or any of the other life-threatening emergencies described in earlier study sessions. In the next Module, the continuum of care moves forward to the conduct of *Postnatal Care.*

Table 11.1 Important activities during transfer of the woman to a hospital.

Aim to maintain:	**Actions**
Contraction of the uterus	Apply gentle uterine massage, or two-handed compression of the uterus, and maintain this during referral
Empty bladder	If the woman cannot urinate, insert a self-retaining catheter to drain the bladder and leave it in place during referral

Adequate blood volume	If the woman is haemorrhaging or in shock, administer intravenous fluids and maintain the infusion during referral
Vital signs	Check colour, pulse, blood pressure, temperature, blood loss, level of consciousness
Warmth	Cover the woman with blankets
Position	The woman should lie flat, but with her legs raised above the height of her head to help maintain her blood pressure
Confidence	Give the woman your emotional support and reassurance; keep her as calm as possible
Accurate records and referral note	Write down all your findings and the interventions you are making on the referral note, with the woman's history and identification details

■ What are the two most important points to remember about PPH?

□ You should remember that:

- Although some risk factors are associated with PPH, two thirds of women who develop PPH have no known risk factors. Which women will develop PPH is therefore highly unpredictable.
- Because of this you need to be alert to the possibility of PPH for every woman in your care who gives birth. And because PPH is life-threatening you must be ready to take appropriate emergency action, including getting her as quickly as possible to a health facility.

Summary of Study Session 11

In Study Session 11, you have learned that:

1 Postpartum haemorrhage (PPH) is one of the leading causes of maternal death in developing countries. It is difficult to predict which women will develop PPH, so you should be prepared to deal with it at every birth.

2 PPH can be prevented to a great extent by skilled care during pregnancy, labour and delivery, and the immediate postpartum period.

3 During antenatal care, all pregnant women should receive advice about diet and malaria prevention, treatment for hookworm, and iron/folate supplements to prevent anaemia, which is a risk factor for PPH.

4 Refer early if labour is prolonged and control the delivery of the baby's head during second stage to prevent traumatic PPH.

5 After delivery of the baby, give misoprostol or oxytocin to prevent atonic PPH, and massage the uterus after delivery of the placenta.

6 If PPH develops, identify the cause of the bleeding. If due to atonic uterus (with or without with retained placenta), massage the uterus using two-handed pressure, empty the bladder (using a catheter if necessary), secure an IV fluid infusion, and administer either a second dose of oxytocin 10 IU by intramuscular injection, or a second dose of misoprostol 400 µg rectally or by putting the tablets under her tongue.

7 If PPH is due to trauma, apply firm pressure to the source of the bleeding with a sterile pad for 10 minutes. If bleeding continues, reapply the

pressure and refer the woman to a health facility where the tear can be repaired.

8 When you need to arrange referral to a health facility, stay with the mother, checking her vital signs, maintaining uterine pressure and giving her warmth and emotional support.

Self-Assessment Questions (SAQs) for Study Session 11

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering the following questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 11.1 (tests Learning Outcome 11.1)

You are drafting the information that you want to send with the referral notice for a mother with PPH and you write it out as below. A young trainee colleague asks you to explain what you have written. How would you explain your referral note, including all the terms in **bold**, so that your colleague can understand?

> 'I am referring Mebrihit. She is a **high parity** mother with **excessive bleeding** and is considered to be experiencing **primary postpartum haemorrhage**. I was careful to avoid **trauma** when assisting her delivery. Palpation indicates **atonic postpartum haemorrhage** which I suspect is due to failure of the **myometrium**.'

SAQ 11.2 (tests Learning Outcomes 11.2 and 11.3)

You are assessing a pregnant woman in your care for potential risk of PPH.

(a) What questions would you ask her and what would you remember to check as part of your antenatal care visit?
(b) What checks and interventions would you make during her labour and delivery?

SAQ 11.3 (tests Learning Outcome 11.4)

Gelila delivered a baby 40 minutes ago. You gave her 600 µg of misoprostol orally immediately after the birth, but the placenta has not come out yet. She has emptied her bladder. After 10 minutes the placenta comes out and you check that it is intact, but Gelila starts bleeding heavily. What do you do?

Notes on Self-Assessment Questions (SAQs) for *Labour and Delivery Care*

Study Session 1

SAQ 1.1

Check your definitions of the bold terms by finding each of them in Study Session 1 and comparing what you have written in your Study Diary with our definition in this session. If any of your definitions were different from ours, try Activity 1.1 again until you get all of them right.

SAQ 1.2

(a) Mrs Abeba is in true labour because her pains are signs of adequate uterine contractions: they are regular, frequent (2–3 every 8 minutes), and the duration is about 40 seconds, which is expected in true labour. Her cervix is effaced and dilated to 4 cm after 3 hours of contractions.

(b) She is in the first stage of labour, at the cross-over point between the latent phase and the active phase, which occurs when the cervix is dilated to 4 cm.

(c) Reassure Mrs Abeba that labour can begin normally without a 'show'. Her contractions have been coming for 3 hours without stopping, and their strength and regularity are as expecedt in a normal labour.

SAQ 1.3

The completed version of Table 1.3 is shown below.

True labour	**False labour**
Contractions occur at regular intervals	Contractions occur at irregular intervals.
Duration of each contraction gradually increases	Duration remains unchanged – either long or short
Intensity of contractions becomes stronger and stronger	Intensity remains unchanged
Cervix progressively dilates	Cervix does not dilate
Discomfort cannot be stopped by strong anti-pain medication	Discomfort usually relieved by anti-pain medication or by walking

SAQ 1.4

A is *false.* Lightening is when the baby drops *lower* in the abdomen before labour begins.

B is true. The second stage of labour ends with the expulsion of the baby from the birth canal.

C is true. The fourth stage of labour lasts for 4 hours and begins when the placenta and fetal membranes have been expelled.

D is *false.* The overlapping of fetal skull bones during the descent through the mother's pelvis is called *moulding* (not flexion).

E is true. The fetal head is engaged when the occiput of the fetal skull reaches the level of the ischial spines in the mother's pelvis.

F is *false.* During a normal birth, one of the baby's shoulders is born first, followed by the other shoulder.

Study Session 2

SAQ 2.1

You need to immediately undertake a rapid evaluation to decide whether there is any reason to refer the young woman for emergency care by:

- Checking the fetal heartbeat (is it within the normal range of 120-160 beats/minute);
- Checking her vital signs: blood pressure, pulse and temperature, to see if they are within the normal ranges (see Section 2.1.1)
- Looking to see if there any signs of bleeding or leaking of amniotic fluid
- Asking her (or someone with her) if she has a headache/blurred vision, difficulty breathing, convulsions, severe abdominal pain

If there are signs of fetal distress (heart rate outside the normal range), or any of the vital signs are outside the normal range, or if any of the danger symptoms are present, you should refer her immediately.

SAQ 2.2

Table 2.1 Leopold's manoeuvres completed.

Name of palpation	**Area of the abdomen to be palpated**	**What you are checking**
Fundal palpation	With hands near the top of the mother's abdomen, press your fingers around the fundus of the uterus	Fetal lie – whether it is lying longitudinally (normal), obliquely or transversely
Lateral palpation	Hands placed flat on either side of the middle of the abdomen; first one and then the other pushes inwards	An initial diagnosis of how the baby is lying and whether it is 'head down' or breech
Deep pelvic palpation	Facing the mother's feet, with hands on the lower part of her abdomen, press inwards with your fingers just above her pubic bone	Confirmation of whether the presentation is cephalic (head down) or breech (bottom down)
Pawlick's grip	Fingers grip the fetal head just above the mother's pubic bone	Whether the fetal head has engaged in the cervix – if you can only grip it with two finger-widths above the mother's pubic bone the head is engaged

SAQ 2.3

(a) To take Makeda's history you will need to make her feel comfortable talking to you. You do this by following the principles of **woman-friendly care** in how you put your questions, and by listening carefully, answering her questions and keeping what she tells you private (look again at Box 2.1 for all the details of woman-friendly care).

(b) Information that you need from Makeda:

- Her name, age, height, address, religion (if she is willing to tell you) and occupation (if she is employed).
- What is her 'presenting symptom' (e.g. labour pains, feelings of bearing down?)
- Whether she has had previous pregnancies and births (how many and whether there were any complications).
- When was the first day of her last normal menstrual period?
- Whether she has noticed any **danger symptoms** (e.g. vaginal bleeding, headache, abnormal vaginal discharge).

SAQ 2.4

Before starting the vaginal examination remember to follow the principles of woman-friendly care and reassure Makeda about her privacy. Then wash your hands thoroughly and put on new surgical gloves. During the examination you check:

- The extent of cervical dilation
- The size of Makeda's pelvis and the adequacy of the passage for the fetus
- The extent of any **moulding** (overlapping) of the fetal skull bones because of pressure from the birth canal
- Any abnormal, foul smelling discharge, any scarring, or swelling (all of these are warning signs and if you detect any refer Makeda to a health facility).

SAQ 2.5

(a) **A** is True. A **high grade fever** is a temperature above 38.5ºC (**low grade fever** is between 37.5–38.4ºC.

(b) **B** is *false*. The **gestational age** is the number of weeks the fetus has been in the uteral calculated from the date when the women's **last normal menstrual period (LNMP)** began.

(c) **C** is *false*. P**arity** is the number of babies delivered *either* alive or dead after 28 weeks of gestation.

(d) **D** is true. Gravidity is the total number of previous pregnancies regardless of the outcome.

(e) **E** is true. An abdominal **scar** indicates the possibility of scarring of the uterus which increases the risk of uterine rupture.

(f) **F** is *false*. **Fundal palpation** means palpating the dome-shaped upper part of the uterus called the **fundus** to check the position of the fetal head.

(g) **G** is *false*. **Breech presentation** is when the buttocks are the presenting part indicating potential difficulties at delivery and the need for referral.

(h) **H** is *false*. A**uscultation** is listening to sounds inside the abdomen.

Study Session 3

SAQ 3.1

To reassure Almaz, be kind and respect her and her culture and norms. Show interest in her. Explain what is happening and how the labour will progress. Encourage her to ask questions and express her ideas and worries. Tell her about the condition of her baby. Allow a trusted support person to be with her. Explain each procedure before you do it.

SAQ 3.2

Measuring Almaz's blood pressure, temperature and pulse helps you to know about her condition. By checking the fetal heartbeat it is possible to identify the presence of fetal distress. Monitoring the contractions, cervical dilatation and descent of the baby's head all help to assess the progress of labour. (When you have learned about the partograph in Study Session 4, you will know that it is the best tool to follow the progress of labour and to detect any abnormality on time).

SAQ 3.3

During the first stage of labour, a high calorie fluid diet is recommended. Some examples are tea, soft drinks, soup, and fruit juice. Almaz should drink at least one cup every hour.

SAQ 3.4

Adopt standard precautions and infection prevention procedures during vaginal examinations and conducting the delivery. Wash your hands before and after each procedure for at least 2 minutes, using soap and clean water or an alcohol hand cleaner. Wear clean protective clothing such as an apron, goggles, mask, gloves and shoes. Use safe waste disposal methods (burying or burning). Scrub, decontaminate and sterilize metal or glass instruments using a 0.5% chlorine solution for 10 minutes, then cleaning with soapy water and boiling or using a sterilization machine.

SAQ 3.5

You would measure *vital signs* in the mother: blood pressure and temperature every 4 hours, pulse every 30 minutes.

You would monitor the *frequency, length and strength of her contractions* every 30 minutes; in normal labour, as the labour progresses, contractions become faster, stronger and more frequent.

Cervical dilatation is assessed by doing a vaginal examination every 4 hours; in normal labour the average rate for cervical dilatation is at least 1 cm per hour.

You would measure the *descent of the presenting part* every 2 hours by abdominal palpation of the fetal head in relation to the pelvic brim, or by vaginal examination.

SAQ 3.6

The presence of dark-green meconium in the amniotic fluid leaking from Almaz's vagina during labour suggests fetal distress; meconium is the baby's first stool and it does not normally pass stool until after the birth. The fetal heart rate in a distressed baby during labour and delivery could either be significantly above or below the normal range of 100–180 beats per minute.

SAQ 3.7

A is true. Respecting maternal preferences includes how she wants to give birth.

B is *false.* During the first stage of labour the mother should drink at least one cup of fluid every hour to prevent dehydration.

C is *false.* The *frequency* of contractions refers to how *often* they come in every 10 minute period during the labour; it does not refer to how painful they become, which is the *strength* of contractions.

D is true. Meconium discharged from the vagina is a sign of fetal distress.

E is true. The 'three cleans' are clean hands, clean surface for delivery and clean equipment.

Study Session 4

SAQ 4.1

(a) As a gravida 5, para 4 mother you know that Bekelech has had 5 pregnancies of which 1 has not resulted in a live birth**.**

(b) At 40 weeks and 4 days the gestation is term (or full term).

(c) Bekelch's cervix has dilated to 5 cm and she is having four contractions in 10 minutes of 35–40 seconds each, so she has entered the active phase of first stage labour. At –3 station, the fetal head is not yet engaged.

(d) The fetal heart rate is within the normal range of 120–160 beats/minute.

(e) As Bekelech's labour is in the active phase and her cervix has dilated to more than 4 cm, you immediately begin regular monitoring of the progress of her labour, her vital signs, and indicators of fetal wellbeing distress. You record of all these key measurements on the partograph (refer again to Figure 4.1 and Section 4.2.1).

(f) You decide to do vaginal examinations more frequently than the advisory four hours, because Bekelech's labour may progress quite quickly as she is a multigravida/multipara mother. And you keep alert to the possibility of something going wrong, because Bekelech has already lost one baby before it was born.

SAQ 4.2

Two key reasons for using a partograph are because:

(a) If used correctly it is a very useful tool for detecting whether or not labour is progressing normally, and therefore whether a referral is needed. When the labour is progressing well, the record on the partograph reassures you and the mother that she and her baby are in good health.

(b) Research has shown that fetal complications of prolonged labour are less common when the birth attendant uses a partograph to monitor the progress of labour.

SAQ 4.3

(a) Good progress of labour is indicated by: a rate of dilation of the cervix that keeps it on or to the left of the alert line; evidence of fetal descent coinciding with cervical dilation; and contractions which show a steady increase in duration and the number in 10 minutes.

(b) Fetal wellbeing is indicated by: a fetal heart rate between 120–160 beats/minute (except for slight changes lasting less than 10 minutes); moulding (overlapping of fetal skull bones) of not more than +2; and clear or only slightly stained liquor (C or M_1).

(c) In a normally progressing labour, you would measure the mother's blood pressure (every 4 hours), pulse (every 30 minutes), temperature (every 2 hours) and urine (every time it is passed), and record them on the partograph.

(d) Indicators for immediate referral include: slow rate of cervical dilation (to the right of the Alert line on the partograph); poor progress of labour, together with +3 moulding of the fetal skull; fetal heartbeat persistently below 120 or above 160 beats/minute; liquor (amniotic fluid) stained with meconium, depending on the stage of labour, even with normal fetal heart rate: (refer M_1 liquor in latent first stage; M_2 liquor in early active first stage, and M_3 liquor in any stage, unless labour is progressing fast.

Study Session 5

SAQ 5.1

A is true. Full dilatation of the cervix to 10 cm is the most important sign that second stage of labour is beginning.

B is true. In second stage, the mother's genitals tend to bulge during contractions and relax between contractions.

C is *false.* Crowning is when the top of the baby's head stretches the vaginal opening to the size of your hand and it stays in the opening even between contractions.

D is *false.* In a normal delivery, the baby moves down the birth canal facing the *back* of the mother's body, with its own back towards her belly.

E is *false.* While it is still in the birth canal, the baby's heartbeat tends to get *slower* (not faster) during a contraction.

F is true. You should let the mother choose the position that she feels most comfortable in when she gets the urge to push in the second stage of labour.

SAQ 5.2

Warning signs that second stage may not be progressing normally include:

- Fetal heartbeat stays above or below the normal range (120–160 beats per minute) even between contractions of the mother's uterus.
- A sudden gush of amniotic fluid leaves the vagina, which may indicate a cord prolapse or placental abruption.
- A multigravida mother has been pushing for 1 hour without the baby moving down the birth canal, or a primigravida mother has been pushing for 2 hours with no good progress.
- Baby is not descending and there are signs that it is developing caput or excessive moulding of the fetal skull.

SAQ 5.3

First, try to loosen the cord and slip it over the baby's head. If you cannot loosen it and it is preventing the baby from being delivered, clamp the cord in two places (or tie it with very clean string) and cut it in between the clamps. Be careful not to cut the mother or the baby's neck.

SAQ 5.4

The correct sequence is as follows:

B Wash your hands well and put on sterile gloves and other protective clothing.
F Clean the mother's perineal area with antiseptic.
D Press one hand firmly over the mother's perineum.
J Use a piece of cloth or gauze to cover the mother's anus in case any faeces come out with the baby.
H Use your other hand to apply gentle downward pressure on the top of the baby's head to keep it flexed (bent downwards).
A Once the baby's head is born, help it to breathe by clearing its nose and mouth.
K Check that the cord is not around the baby's neck.
C To prevent tearing of the mother's birth vagina or perineum, deliver the baby's shoulders one at a time.
E When the baby has been completely delivered, put it on the mother's abdomen and dry it with a clean cloth.
I Cover the baby to keep it warm and give it a chance to breastfeed straight away.
G Clamp or tie the cord in two places and cut it in between the clamps.

SAQ 5.5

To help bonding between the mother and her newborn baby you place the baby on the mother's abdomen as soon as it is born, and give it an early opportunity to breastfeed. Do not separate the mother and her baby during at least the first hour after the birth.

Study Session 6

SAQ 6.1

(a) The third stage of labour begins with the birth of the baby and ends with the delivery of the placenta and its attached membranes.

(b) The physiological changes are:

- As the placenta separates from the wall of uterus blood from the vessels in the placenta bed begin to clot between the placenta wall and the myometrium (the muscular wall of the uterus).
- The placenta moves down the birth canal and through the dilated cervix before being expelled.
- Once expelled, the muscles of the uterus contract and compress the torn blood vessels so that any postpartum bleeding is stopped, and the uterus becomes hard and round.

SAQ 6.2

Six steps to follow:

1 Check: is there a second baby?

2 Give a uterotonic drug to help the uterus contract:

- Misoprostol 600 µg (micrograms) tablets given orally with water, or
- Oxytocin 10 IU injected intramuscularly.
- Do NOT give ergometrine.

3 Deliver the placenta by controlled cord traction with counter-pressure (see Box 6.3 for details of how to do this).

4 Massage the uterus.

5 Examine the placenta and fetal membranes to check nothing is missing (i.e. check the maternal surface and the lobules, put your hand inside the membranes to make sure they are complete, and check that the position of the cord is normal).

6 Examine the women's vagina and external genitalia for signs of tears and active bleeding.

SAQ 6.3

(a) Yes, so long as you do not exceed 1,000 µg of misoprostol in total, you can give up to a further 400 µg if you have already given 600 µg. You should give the second dose by inserting the tablets into the rectum.

(b) As the mother has already begun breastfeeding, rub the uterus using the two-handed pressure method to stimulate contractions.

(c) If the bleeding does not stop quickly after the second dose of misoprostol, you need to refer the woman to the nearest health facility as quickly as possible, starting her on IV fluids before you go.

SAQ 6.4

Warning signs of potential complications during the third stage of labour are:

- A retained placenta or a placenta that has only been partially expelled
- A cervix which has closed before the delivery of the placenta
- Weak uterine contractions
- A soft uterus felt on palpation
- Third stage of labour lasting over 30 minutes
- Perineal, vaginal or cervical tearing
- Excessive bleeding (postpartum haemorrhage).

Study Session 7

SAQ 7.1

(a) Atsede's baby is severely asphyxiated. The danger signs are that he was not making any breathing effort, or moving his limbs, he was covered with meconium and tactile stimulation had no effect.

(b) Your next step is to dry him quickly, wrap him warmly, and remove meconium from his mouth and nose with the bulb syringe and a clean cloth. Listen for an apical heartbeat and if it is below 60 beats/minute, begin heart massage, alternating with ventilating the baby at about 40 breaths per minute.

(c) The birth complication in this newborn could have been prevented by Atsede receiving skilled birth attendance much earlier in her labour from someone who could monitor the signs of fetal distress and refer her for emergency care; 38 hours is too long to wait.

SAQ 7.2

The basic equipment you will need in order to resuscitate a newborn with breathing difficulties are:

- Two clean linen/cotton cloths: one to dry the newborn and one to wrap him or her afterwards
- Plastic bulb syringe to remove secretions from the mouth and nose, especially when meconium is present
- Ambu-bag and mask to give oxygen directly into the baby's lungs
- A person trained in neonatal resuscitation (like you)
- Heat source (lamp) to provide warmth, if possible.

SAQ 7.3

A is *false.* If a newborn cries soon after birth, it is a sign of asphyxia occurring before delivery.
B is *false.* Cyanosis means having a bluish colour to the skin because of oxygen shortage (asphyxia).
C is true. The apical heartbeat can be detected by listening to the baby's chest with a stethoscope.
D is *false.* Gas exchange in the lungs happens when carbon dioxide is breathed *out* and oxygen is breathed *in*.
E is *false.* Giving the newborn a vitamin K injection is to prevent spontaneous bleeding; tetracycline ointment is given to prevent eye infections.
F is true. The recommended ventilation rate for newborns is 40 breaths/minute.

SAQ 7.4

Only two of the ways in the list are recommended for gentle tactile stimulation of the baby:

- Rubbing the abdomen gently up and down
- Flicking the underside of the baby's foot with your fingers.

All the other ways listed are dangerous and should not happen.

SAQ 7.5

The completed Table 7.1 is below.

Table 7.1 Completed

Newborn health risk	**Essential newborn care**
Eye infection	Apply tetracycline eye ointment
Spontaneous bleeding	Inject 1 mg vitamin K intramuscularly
Skin-to-skin contact with mother, blankets and cap	Hypothermia
Early breastfeeding or adequate replacement feeding	Hypoglycaemia

Study Session 8

SAQ 8.1

A is true. The fundus is the 'rounded top' and widest cavity of the uterus.

B is true. Complete breech is where the legs are bent at both hips and knee joints and are folded underneath the baby.

C is *false*. A frank breech is the most common type of breech presentation and is when the baby's legs point straight upwards (see Figure 8.4).

D is true. A footling breech is when one or both legs are extended so that the baby presents 'foot first'.

E is *false*. Hypoxia is when the baby is deprived of oxygen and risks permanent brain damage or death.

F is *false.* Multiple pregnancy is when there is more than one fetus in the uterus.

G is *false.* Monozygotic twins develop from a single fertilized ovum (the zygote), and *they are always the same sex*, as well as sharing the same placenta.

H is true. Dizygotic twins develop from two zygotes, have separate placentas, and can be of the same or different sexes.

SAQ 8.2

In a *normal* presentation, the **vertex** (the highest part of the fetal head) arrives first at the mother's pelvic brim, with the **occiput** (the back of the baby's skull) pointing towards the front of the mother's pelvis (the **pubic symphysis**).

Abnormal presentations are when there is either a **vertex malposition** (the occiput of the fetal skull points towards the mother's back instead towards of the pubic symphysis), or a **malpresentation** (when anything other than the vertex is presenting): e.g. **breech presentation** (buttocks first); **face presentation** (face first); **brow presentation** (forehead first); and **shoulder presentation** (transverse fetal).

SAQ 8.3

(a) The common complications of malpresentation or malposition of the fetus at full term include: premature rupture of membranes, premature labour, prolonged/obstructed labour; ruptured uterus; postpartum haemorrhage; fetal and maternal distress which may lead to death.

(b) You should refer the mother to a higher health facility – she may need emergency obstetric care.

(c) You should *not* attempt to turn the baby by hand. This should only be attempted by a specially trained doctor or midwife and should only be done at a health facility.

SAQ 8.4

(a) How to check if this pregnancy is twins:

- Is the uterus larger than expected for the period of gestation?
- What is its shape – is it round (indicative of twins) or heart-shaped (as in a singleton pregnancy)?
- Can you feel more than one head?
- Can you hear two fetal heartbeats (two people listening at the same time) with at least 10 beats difference?
- If there is access to a higher health facility, and you are still not sure, try and get the woman to it for an ultrasound scan.

(b) How do you reduce the risks during delivery of twins?

- Be extra careful to check that the mother is not anaemic.
- Encourage her to rest and put her feet up to reduce the risk of increased blood pressure or swelling in her legs and feet.
- Be alert to the increased risk of pre-eclampsia.
- Expect her to go into labour before term, and be ready to get her to the health facility before she goes into labour, going with her if at all possible.
- Get in early touch with that health facility to warn them to expect a referral from you.
- Make sure that transport is ready to take her to a health facility when needed.

Study Session 9

SAQ 9.1

The three 'Ps' (powers, passenger and passage) are a shorthand way of describing the main causes of obstructed labour. After you have checked your answers with ours (below), re-read Section 9.2 for more detail about the causes.

- Powers refers to the strength of the uterine contractions – too weak or uncoordinated and the baby is not pushed down the birth canal.
- Passenger refers to the baby – if the head is too big or deformed, or if the position or presentation is wrong, the baby will not be able to pass down the birth canal.
- Passage refers to the birth canal – if it is too small or deformed, or has blockages from tumours or scars, the baby will not be able to pass smoothly.

SAQ 9.2

(a) Perinatal mortality and morbidity - fetal and newborn deaths, and disease and disability occurring around the time of the birth.

(b) Prolonged latent phase of labour - when true labour lasts for more than about 8 hours without entering into the active first stage.

(c) Prolonged second stage of labour - when it lasts for more than 1 hour (for multigravida mothers) and more than 2 hours (primigravida mothers).

(d) Malposition - when the baby is 'head down' but the vertex (the top of the baby's skull) is in the wrong position relative to the mother's pelvis.

(e) Caput - a large central swelling on the fetal skull.

(f) Fistula — an abnormal opening (usually resulting from a tear) between the vagina and the urinary bladder (or the rectum or urethra or ureter).

SAQ 9.3

(a) The following signs in Tadelech's case study suggest both prolonged and obstructed labour:

- It is clear that while Tadelech has been in the active first stage of labour for some time (dilated cervix of 8 cm), but she may actually be in a **prolonged active phase of labour** (when true labour lasts for more than about 8 hours without finally entering the second stage). Since you have not been monitoring her labour up to this point, you cannot be absolutely sure whether her cervix is dilating slowly, or if dilatation has completely ceased and the labour is not progressing at all.
- The two swellings (masses) above and below the depression in her abdomen known as **Bandl's ring** indicate an obstructed labour.
- Furthermore, at –3 the baby's head is not engaged, and remains above the pelvic brim; this indicates that it is not descending as you would expect it to do after Tadelech has been in labour for two days.
- The hot and dry vagina and **oedema** (swelling due to collection of fluid in the tissues) of the vulva are further signs of a potential obstruction.

(b) It is clear that Tadelech needs urgent referral to a health facility. Your actions should be to:

- Explain this calmly to her and her family.
- Activate the birth preparedness plan to get her transferred to a health facility as quickly as possible, together with her birth companion.
- Tadelech's vital signs suggest she is in shock: she has a fast pulse rate and low blood pressure). Her hot and dry vagina indicates dehydration. You begin treating her for shock and dehydration by giving her an intravenous infusion (see Section 9.4) and keeping it working during the trip to the higher health facility.
- If the obstruction appears partly to be caused by an overfull bladder which the woman cannot empty in the normal way, you drain this using a catheter.

SAQ 9.4

You can reduce the risks of obstructed labour by:

- Teaching the importance of good childhood nutrition to ensure that girls' pelvic bones have the best chance of developing to the normal size for safe delivery.
- Promoting family planning and discouraging early marriage and especially pregnancy at less than 18 years of age.
- Explaining the importance for the safety of the mother and baby of having a skilled care attendant at all deliveries.
- Assisting your community in organizing birth preparedness teams so that in an emergency they can get the mother to the nearest health facility as quickly as possible.
- Always using a partograph to monitor the progress of labour.

Study Session 10

SAQ 10.1

Factors predisposing a woman to develop a uterine rupture (key words in **bold**) are:

- Obstructed labour caused by: the fetal head being too large or the mother's pelvis being too small for the baby to descend through the birth canal (**cephalopelvic disproportion**); **malpresentation** and **malposition** of the fetus; or **multiple pregnancy** (see Study Session 8 for details of all these).
- Other physical obstructions such as a tumour, or scarring from damage at a previous birth (e.g. a **fistula**, a torn opening between the vagina and bladder, rectum, urethra or ureter).
- Traditional practices, e.g. inappropriate abdominal massage or pushing down on the fundus during labour.
- Inappropriate use of a **uterotonic drug** (used to cause contractions).

SAQ 10.2

Primiparous women are giving birth for the first time. In a first birth there is the likelihood of a longer labour. However, in primiparous women, **uterine inertia** (contractions become weaker and shorter, with longer intervals) occurs after about 36 hours, greatly reducing the risk of uterine rupture.

In contrast, in **multiparous** women have had at least one baby after 28 weeks' gestation, the uterus will go on contracting strongly for much longer than the primiparous uterus. If obstruction prevents delivery for a long time, particularly if there is scarring from a complicated earlier birth, the uterus is much more likely to rupture.

SAQ 10.3

The completed version of Table 10.1 appears below.

Table 10.1 Warning signs of possible uterine rupture (completed).

Actions	Warning signs
Timing the stages of labour	Labour is prolonged: latent first stage lasts more than 8 hours; active first stage lasts more than 12 hours; second stage lasts more than 1 hour in a multipara, or more than 2 hours in a primipara
Timing the uterine contractions	Persistent uterine contractions of 60–90 seconds duration or longer, occurring more than 5 times in every 10 minutes
Checking the fetal heart rate	Fetal heart rate persistently above 160 beats/minute or below 120 beats/minute
Checking the abdomen	Lower segment of the uterus is tender on palpation; Bandl's ring is present
Checking the vagina	Vaginal bleeding may be present

SAQ 10.4

(a) Complications of uterine rupture include:

- Death of the fetus unless there is immediate surgery to remove it.
- Severe haemorrhage and haemorrhagic shock for the mother (identified by faintness, pale skin, fast pulse, dropping blood pressure, fast breathing, lapses into unconsciousness, reduced urine output) leading to death of the mother unless she gets immediate treatment.
- Infection: **peritonitis** (infection of the abdominal cavity) and/or **septicaemia** (bacterial infection of the blood), leading to potentially fatal **septic shock**.
- Acute kidney failure (because of loss of blood volume).
- Hysterectomy.

(b) The most important action is to get the woman to the nearest health facility capable of dealing with a ruptured uterus as quickly as possible; she needs to be kept warm and calm, lying down with feet higher than 'her' head and her head on one side. You should give her intravenous fluids. If she is unconscious do not give anything by mouth.

Study Session 11

SAQ 11.1

Here is how you could have explained to your trainee colleague what you had written in your referral note:

> 'I am referring Mebrihit. She has had more than 5 pregnancies (**high parity**) and developed bleeding in excess of 500 ml of blood (**excessive bleeding**) within 24 hours of delivery (**primary postpartum haemorrhage**). I was very careful to avoid any injury (**trauma)** during the delivery. Feeling her abdomen (palpation) indicates that her uterus is soft and has not contracted properly after delivery (**atonic postpartum haemorrhage**). I suspect this is because the muscular wall of her uterus (**myometrium**) is failing to contract and close the blood vessels where the placenta pulled away from the uterus'.

SAQ 11.2

Here are some of the questions to ask and things to do. We expect you may have thought of even more.

(a) Antenatal care - questions to ask and things to check:

- Is she a first-time mother (primiparous) or has she had one or more deliveries already (multiparous), i.e. putting her more at risk of atonic PPH?
- If multiparous, was her earlier baby very large (over 4 kg) or did she have twins? (either of which may have overstretched her uterus).
- Does she remember if she had an excessive amount of amniotic fluid in a previous pregnancy (polyhydramnios)? More than 3 litres can also overstretch the uterus.
- Have you screened for anaemia (which you should continue in your postnatal checks)? If she has anaemia have you advised her about good nutrition?
- Is the community transport plan ready in case of emergency referral?

(b) During and after delivery – interventions to make and things to check:

- Make sure she regularly empties her bladder to avoid interfering with normal uterine contractions, including immediately after birth.
- Use the partograph to monitor labour progress so that you quickly notice any signs that might potentially lead to PPH (e.g. obstruction leading to possible uterine rupture).
- Be careful not to encourage pushing before the cervix is fully dilated and help to ensure controlled delivery of the baby's head and shoulders in order to prevent tears.
- Encourage and help the mother to breastfeed immediately (so she starts to make her own oxytocin, which will stimulate the uterus to contract).
- Check that the placenta has fully separated and is intact, then rub the uterus every 15 minutes for the first 2 hours to help keep the uterus well contracted.

SAQ 11.3

Here is what you should do:

- Immediately shout for Gelila's family and neighbours to get transport ready in case the bleeding becomes excessive and she needs to go to the nearest health facility.
- Check her rate of bleeding and unless it has quickly reduced, assume this is a case of atonic postpartum haemorrhage.
- If she had 600 µg misoprostol after the birth, give her a second dose of 400 µg misoprostol rectally or under her tongue to help her uterus to contract. If she had oxytocin before, give her another 10 IU by intramuscular injection.
- Lie Gelila on her back with her feet higher than the head, cover her with blankets and make sure she is warm.
- If you are trained to do so, begin pre-referral infusion of IV fluids.
- Try rubbing the uterus to encourage it to contract. If this fails then try two-handed compression on the uterus. If the bleeding stops and the uterus starts to feel firm, slowly release the pressure. If bleeding doesn't stop, continue the referral process and get her to the health facility as quickly as possible.
- Accompany Gelila to the facility, checking her vital signs, and continuing to administer intravenous fluids. Make sure her baby comes too and that there are appropriate people to look after it and to act as possible blood donors.
- Write down everything that you have done on the referral note, together with Gelila's history and identification details.