2.1 Antenatal care and the hospital

Introduction
For a variety of logistic and cultural reasons in resource- limited countries, the first time a woman attends a health facility during pregnancy may be because of a medical problem or because she is in labour. This often means that she is medically compromised even before giving birth, and at high risk of morbidity and mortality.

Antenatal care in such settings tends to be opportunistic, and the ways in which care is delivered must be innovative and optimised to ensure that comprehensive care reaches as many pregnant women and girls as possible. This might mean outreach teams going out to the rural areas (‘trekking’), rather than the women having to make the long journey to the healthcare facility, often on foot. Usually the staff who undertake such visits are midwives and nurses, rarely doctors.

Such problems particularly affect rural areas at long distances from the nearest facility and where roads are poor. Hospital workers have a duty to ensure that they work with the community health teams to facilitate antenatal care.

Definitions of pregnancy-related events
Maternal mortality is the death of any woman or girl, from any cause, while pregnant or within 42 days of the end of pregnancy.

Gravidity is the number of times that a woman or girl has been pregnant. Parity is the number of times that she has given birth to a fetus with a gestational age of 24 weeks or more, regardless of whether the child was born alive or was stillborn.

For example, in gravida 2:para 2 (G2 + P2) the woman or girl has had two pregnancies and two deliveries after 24 weeks, and in gravida 2:para 0 (G2 + P0) the woman or girl has had two pregnancies, neither of which survived to a gestational age of 24 weeks. If these individuals are both currently pregnant again, they can be referred to as G3 + P2 and G3 + P0, respectively.

- A nulliparous woman or girl has not given birth previously (regardless of outcome).
- A primigravid woman or girl (a primigravida) is in her first pregnancy.
- A primiparous woman or girl has given birth once.
- A multigravid woman or girl (a multigravida) has been pregnant more than once.
- A multiparous woman has given birth more than once.
- A grand multipara is a woman who has already delivered four or more infants who have achieved a gestational age of 24 weeks or more. Such women are considered to be at higher than average risk in subsequent pregnancies.
- A grand multigravida has been pregnant four times or more.

Multiple pregnancies present a problem with regard to terminology. A multiple gestation counts as a single event, and a multiple birth, should be interpreted as a single parous event.

Rationale for antenatal care
Antenatal care is primarily a means of screening for, diagnosing, and treating conditions which could cause problems during the pregnancy, at delivery and after birth. These conditions may be pre-existing maternal medical disorders or obstetric or fetal complications which arise during the pregnancy itself.

Basic antenatal care
Two conditions are of particular importance to detect and manage antenatally, namely pre-eclampsia and anaemia, as they contribute to a large proportion of maternal and perinatal deaths.

Pre-eclampsia may vary in severity, but commonly presents with mildly raised blood pressure and proteinuria, and may progress to full-blown pre-eclampsia with dangerously high blood pressures, heavy proteinuria and generalised oedema (see Section 2.5.E). Mild and moderate pre-eclampsia is usually asymptomatic, and therefore routine testing of blood pressure and urine in pregnancy is crucial to its detection.

Severe pre-eclampsia can be associated with symptoms such as headache, visual disturbance and epigastric pain, and commonly leads to eclamptic fits, cerebrovascular accidents or HELLP syndrome (Haemolysis, Elevated Liver enzymes and Low Platelets), all of which carry a very high mortality. Timely intervention, by lowering the blood pressure, delivering the baby and treating fits if they occur, may be life-saving.

It is also vitally important to detect and treat anaemia antenatally, to reduce the woman’s risk of dying should she experience a postpartum haemorrhage (see Sections 2.5.B and 2.8.D).

As far as possible there should be a structured approach to antenatal care. (A card or booklet designed and implemented by individual Ministries of Health for pregnant women or girls to keep and bring to clinics is helpful.) At the first encounter, an attempt should be made to obtain as full a history as possible, time permitting. This should include the following details:

- the date of the last menstrual period (LMP), regularity of the menstrual cycle, any contraceptive usage, the date of the positive pregnancy test (if available), and any particular complaints in pregnancy to date
- the previous obstetric history, including complications, mode of delivery and outcome
- the previous medical history
- the family history, especially with regard to hypertension, diabetes mellitus, multiple births and congenital abnormalities
- use of drugs, smoking, and alcohol consumption
- allergies.

The patient must always be examined.

- Look for signs of anaemia (pallor, leuconychia or white
The accuracy of clinical assessment may be reduced by obesity, fibroids, and if the uterus is retroverted.

Accurate dating of the pregnancy is important, as it influences decision making during the antenatal period, particularly around the timing of delivery and whether this is by Caesarean section (CS) or induction of labour. It also aids assessment of the maturity of the fetus if the mother goes into spontaneous labour early.

Bimanual examination, which must be undertaken in an aseptic and careful way (especially if there could be an ectopic pregnancy), is a useful diagnostic tool for dating an early pregnancy (in conjunction with the menstrual date), and in the absence of scanning facilities might be the only available means of calculating the estimated date of delivery (EDD).

At around 4 weeks’ gestation, the cervix starts to change in colour and texture, feels soft and acquires a bluish tinge which may be visualised on speculum examination. The uterus first becomes palpable abdominally at around 12 weeks’ gestation.

Prior to this an estimation of gestational age can be obtained from vaginal examination by assessing uterine size with the following comparisons:

- 6 weeks is equivalent to a plum or golf ball
- 8 weeks is equivalent to a tennis ball
- 10 weeks is equivalent to an orange
- 12 weeks is equivalent to a grapefruit
- 14 weeks is equivalent to a small melon (palpable abdominally).

The accuracy of clinical assessment may be reduced by obesity, fibroids, and if the uterus is retroverted.

Multiple pregnancy and molar change can also lead to a pregnancy larger than dates. At follow-up visits, the history and examination can be more focused on pregnancy events since the last visit. Examination should look for signs of intercurrent problems, anaemia and oedema. At every visit, the blood pressure must be measured and the abdomen palpated to check on the progress of pregnancy.

At all visits after 20 weeks there should be direct questioning for symptoms of pre-eclampsia. If the blood pressure is elevated or rapidly progressive oedema is present, a urine sample must be tested for protein.

Prior to the due date, there should be a discussion about the mode and place of delivery for women with a previous Caesarean section scar. Birth attendants and family members must be informed that there is a high risk of scar rupture, and the woman must deliver in a healthcare site where emergency facilities are available if needed.

They should also be informed of any concerns you may have which might put them at risk of needing intervention at delivery (e.g. twins, a high fetal head at term). These would indicate that they must deliver at an appropriate healthcare facility.

Ideally, there should be waiting homes near the healthcare facility where comprehensive emergency obstetric care (EmOC) is available, set up by the regional health teams, to which they and their attendants can move near to the time of delivery so that they do not have to make a long and potentially dangerous journey while in labour.

All of these details, along with the results of any investigations, should be noted on a small hand-held record (http://eepd.org.uk/wiki/index.php?title=Hand_Held_Records) which the pregnant woman or girl is encouraged to carry with her at all times throughout the pregnancy.

As the pregnancy progresses, the uterus continues to grow and has usually reached the level of the umbilicus by 20–24 weeks (see Figure 2.1.1). Measuring the height of the fundus above the symphysis pubis can also provide a good indication of the growth and gestation of the fetus. The woman should first empty her bladder. The measurement is then made by placing the zero point of the tape measure on the upper border of the symphysis and taking the tape along the uterus in a longitudinal direction to the upper border of the fundus, with the mother lying in the left lateral tilt position.

Between 20 and 34 weeks’ gestation, the length of this measurement (in centimetres) should correspond to the gestational age in weeks of a well-grown fetus (see Figure 2.1.2).
A difference of more than 2 cm too long or too short can indicate complications such as multiple pregnancy (too long), intrauterine growth retardation (too short), or inaccurate measurements of the estimated date of delivery. It should be recognised that fundal height is not an accurate assessment of gestation or fetal size. Even in the absence of confounding factors such as multiple gestation and poly/oligohydramnios, it varies widely depending on the height and weight of the mother and lie of the fetus. In addition, the ‘normal’ fetal size also varies widely depending on patient build and ethnic origin.

Antenatal investigations and interventions
- Ideally a full blood count should be done at least once during the pregnancy, to check the haemoglobin level and, if possible, the red cell indices. Portable systems for measuring haemoglobin include the haemocue and WHO colour card from a finger prick sample, or perhaps, in the future, percutaneous measurement using a transcutaneous haemoglobinometer (currently under development by Masimo).
- Urinalysis must be performed at every visit, to check for protein and glucose.
- Screening for bloodborne viruses (hepatitis B and C and HIV) is not always available (see Section 1.8). All mothers should be advised of the risks involved, and of the precautions they can take to reduce the risk of transmission. Healthcare professionals also need to be made aware of universal precautions and adhere to them at all times.
- Serum samples should be taken for blood grouping and Rhesus status.
- All women should be tested for and when appropriate treated for syphilis (see Section 2.8.H).

ABO and Rhesus incompatibility
At a mother’s first visit to the healthcare site, blood should be taken for ABO typing, determination of Rhesus (Rh) status and detecting the presence of harmful antibodies. The main antibodies of concern are anti-D (usually acquired following feto-maternal haemorrhage), anti-c and anti-Kell (which usually follow blood transfusion), all of which can cause severe haemolytic disease of the newborn. ABO incompatibility can also cause neonatal jaundice in one in 30 cases.

Potential Rh-D sensitising events for a Rhesus-negative mother include miscarriage, termination of pregnancy, ectopic pregnancy, antepartum haemorrhage, and invasive procedures such as external cephalic version. If the mother is not given anti-D immunoglobulin after such events, a second challenge will lead to a massive rise in anti-D antibodies in the mother’s circulation, which can then cross the placenta and destroy Rhesus-positive fetal cells, causing fetal anaemia. The anti-D immunoglobulin should ideally be given within 3 days of the sensitising challenge, but may be effective when given up to 13 days after the challenge. The WHO recommends 1251U per mL of fetal red blood cells found in the maternal circulation. A Kleihauer test can be performed to identify the presence and quantity of feto-maternal haemorrhage. A Kleihauer test indicates a larger feto-maternal haemorrhage.

Due to limited infrastructure, blood bank facilities will not be available at all healthcare sites, but staffed laboratories should be available in district hospitals where the serum sample, taken at the healthcare site, adequately labelled and batched, can be sent for processing.

Immunisation and antimalarial prophylaxis
Routine administration of anti-tetanus toxoid should be offered to all women to reduce the risk of neonatal and maternal tetanus. For women who have never received tetanus toxoid vaccine, or who have no documentation of such immunisation, a total of five doses is recommended – two doses given 1 month apart in the first pregnancy, then one dose in each subsequent pregnancy (or at intervals of at least 1 year), up to a total of five doses.

A single dose does not offer adequate protection, and as the highest level of antibody occurs 24 weeks following the second dose, ideally this should be given around 16 weeks’ gestation, with the first dose being given at least 4–8 weeks earlier in the first trimester, if early attendance allows this.

Intermittent antimalarial prophylaxis should also be offered. Among its other advantages, this may reduce the burden of severe anaemia (see Section 2.8.D).

Ultrasound scanning
Facilities for ultrasound scanning in this setting are usually limited. There may be no funding for a machine. If there is a machine, the staff need to be adequately trained and have the time to use it. Scanning can be useful for assessing the site of pregnancy, the period of gestation, viability, the number of fetuses, presentation and the progress of the pregnancy. If the image quality is good enough, it may also allow the detection of abnormalities, and although intervention might not be possible, this would mean that problems could be anticipated, delivery planned and the mother counselled appropriately.

Specific antenatal problems
It is not possible to discuss the management of every antenatal condition here. Conditions such as anaemia, hypertension and diabetes, which are common complications of pregnancy and becoming increasingly so, are discussed in detail elsewhere in this textbook.

Hyperemesis
Some nausea and vomiting is common in early pregnancy. However, in a small proportion of patients, severe vomiting (hyperemesis) can occur. This condition is more common where there is a larger than normal placental mass (e.g. in multiple pregnancy and molar pregnancy).

Signs of dehydration such as tachycardia, dry mucous membranes and a slow skin pinch can develop. The patient often develops ketoacidosis, which makes the nausea and vomiting worse. For details on managing this condition, see Section 2.6.I.

Organising an effective antenatal care system
Blood bank facilities
A functional and effective blood transfusion service (see Section 1.7) is a vital component of a national health system.
The WHO expects all countries to have national policies and a legislative framework for blood safety, with a centrally coordinated and quality system in place. Ideally, all donors should be unpaid volunteers, and unnecessary transfusion should be avoided. Currently there are large discrepancies between wealthy and resource-limited countries in the availability of this service.

**Antenatal care networks**

One important factor in the delivery of an effective antenatal service is establishing good networks between the community and the healthcare facilities in which births occur.

As was mentioned in the introduction to this section, “trekking” is the setting up of an outreach service by which healthcare providers go to the women, rather than vice versa. This serves to offset the problems of distance and lack of transportation, and may be the first step in facilitating these linkages, as the staff have an opportunity to offer education to the mothers, birth attendants, family and community members on the potential benefits for women of delivering in a healthcare facility. The staff can also advise on warning signs to look out for, and on emergency measures that can be taken before professional help arrives.

Patients and their attendants need to know that they will receive the care they need regardless of whether or not they can afford it.

Perhaps most importantly, hospital staff need to reiterate the vital role that community members can have in averting a tragedy. This will hopefully reduce suspicion and encourage early communication when help is needed, so that critical delays in getting help to a mother can be avoided. A local emergency taxi service set up in each village, and ideally funded by the community and available at all times for women to be taken to the healthcare facility, is one way of addressing this.

One of the responsibilities of the regional health teams is to provide waiting homes near to a health facility, providing comprehensive EmOC, as mentioned earlier, where the high-risk expectant mother and her family members can stay for a short period prior to the birth in case an emergency arises.

If help is summoned following an emergency in the community, an emergency ambulance system, manned by personnel who have been trained in resuscitation and stabilisation, can be used for retrieval, further reducing the delay before the mother first receives skilled care (e.g. wheelbarrow ambulances, http://niaje.com/blog/kiberawheelbarrow-ambulance-innovation-out-of-necessity/).

**Conclusion**

The main keys to providing effective antenatal care are education on the role that it plays and emphasis on the importance of teamwork by all of the parties involved, to ensure the best possible outcome for both mother and baby.

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2.2 Nursing pregnant women and girls in hospital (midwifery)

**Introduction**

Irrespective of where midwifery care is provided, there are universal requirements that should govern the provision of care:

1. provision of a safe healthcare environment for patients and staff
2. respectful and compassionate care for women, the neonate(s) and the family
3. skilled and competent staff to provide a good standard of evidence-based care
4. health education and promotion.

These areas of critical importance are further considered and described concisely in the subsections below. More detailed information on each area can be found in the references listed at the end of this section.

The global human resources target for effective delivery of obstetric care is one skilled birth attendant (SBA) for every 100 expected births. SBAs are defined as midwives, nurses, health officers, medical doctors and obstetricians/gynaecologists.

**Definition of maternal death**

In every action that is undertaken as part of midwifery, the prevention of maternal death must be the first priority.

According to the WHO, pregnancy-related death is defined as the death of a woman or girl while pregnant or within 42 days of the termination of pregnancy, irrespective of the cause of death.

**Safe environment**

**WHO checklist**

The WHO has recently produced a helpful checklist for patient safety with regard to childbirth (www.who.int/patientsafety/implementazione/checklists/en/index.html).

**Infection control**

The microorganisms that cause infection can be transmitted to patients and staff by several routes. These include aerosol, droplet (e.g. coughing and sneezing) and faecal–oral routes, direct contact (person to person), indirect contact (through contaminated food or water, contaminated surfaces or objects), via blood and body fluids, and via insects and parasites. It is vital that basic infection control practices