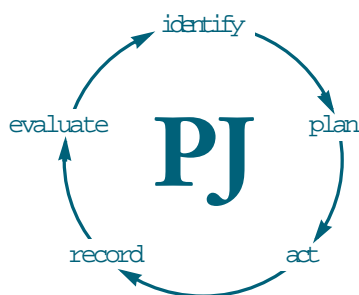


PREGNANCY

(1) OVERVIEW OF PREGNANCYBy *Melanie Every, MSc, and Claire Hallam, BSc*

This introductory article is the first in a series of six, on pharmaceutical care in pregnancy. It outlines the symptoms associated with pregnancy, the development of the fetus and antenatal care



identify gaps in your knowledge

1. Name six signs or symptoms associated with pregnancy.
2. How is the expected delivery date calculated?
3. What kinds of checks are carried out at antenatal visits?

This article relates to the Royal Pharmaceutical Society's core competency of "appropriate advice or referral" (see "Medicines, ethics and practice — a guide for pharmacists", number 26, June 2002, pp105–6). You should consider how it will be of value to your practice.

Pregnancy can be an enjoyable and exciting period for some women, but for others it can also be uncomfortable, frightening and exhausting. Many of the so-called minor symptoms and signs associated with pregnancy are the result of the physiological changes that normally occur as the mother's body adapts to support and protect the growing fetus. Pregnant women may find that they can better cope with some of these changes if they know what to expect and understand the reasons behind them. Where pharmacists are concerned, a knowledge of these changes and their underlying processes is important for both normal changes and abnormalities to be recognised and responded to appropriately. For example, in normal pregnancy, changes in the cardiovascular system can be dramatic.

SIGNS AND SYMPTOMS ASSOCIATED WITH PREGNANCY

The signs of pregnancy can vary. Early signs can include nausea, breast tenderness, frequent urination, fatigue and headaches. Later signs can include heartburn, backaches, constipation and fatigue. The treatment of some of these will be looked at in a later article.

Nausea and vomiting Nausea predominantly affects women during the first three months of pregnancy. Hormonal changes are an attributing factor. Hyperemesis gravidarum is an extreme form of vomiting in pregnancy which can result in admission to hospital.

Increased need to urinate An increased need to urinate occurs early on as well as during the last few weeks of pregnancy when it is caused by the increased pressure on the bladder from the uterus. However, it could also be a symptom of a urinary tract infection, also more common during pregnancy. If the woman has symptoms such as lower abdominal pain or cloudy or offensive urine, she needs to be referred to her GP.

Headache Headaches occur more frequently in pregnancy, mostly as a result of intracranial vascular changes mediated by hormones. Although most headaches are not serious they can be indicative of pre-eclampsia in the later stages of pregnancy.

Feeling hot and sweaty Pregnant women can feel hot and sweaty because of increased cardiac output and peripheral vasodilation.

Dizziness and fainting Peripheral vasodilation in pregnancy can lead to venous pooling in the legs. Also, the expanding uterus can compress the inferior vena cava. Both these changes reduce venous return, cardiac output and blood pressure and this can result in

faintness and dizziness, particularly when standing in warm, crowded environments for long periods.

Fatigue Pregnant women often experience fatigue. Earlier in pregnancy, this is likely to be due to the considerable hormonal changes taking place or energy being used for the additional cardiac work and renal and uteroplacental activity. Later on, a combination of increased body mass and anaemia is a more likely cause.

Varicose veins and haemorrhoids In pregnancy, both varicose veins and haemorrhoids are caused by peripheral vasodilation and pressure from the gravid uterus on the pelvic veins, resulting in more blood in the venous bed. Women can also get vulval varicose veins.

Epistaxis Epistaxis (nosebleed) is more common in pregnancy, but is generally not serious. It is due to more frequent nose blowing (an increased blood supply leads to more mucus in the nose) and vasodilation.

Hypertension and pre-eclampsia From the first three months of pregnancy, heart rate, stroke volume and cardiac output increase. Blood pressure falls until about the 16th week of gestation, after which it increases to levels found in non-pregnant women. The decrease in blood pressure during the first three months can mask chronic hypertension. Where hypertension existed prior to pregnancy this decrease may allow a reduction or cessation of anti-hypertensive treatment, particularly at the beginning of pregnancy. However, monitoring is required after the first three months because blood pressure is expected to rise again and antihypertensive treatment may need to be reintroduced or increased.

Pre-eclampsia is a potentially life-threatening disorder affecting 5–8 per cent of pregnancies. As well as hypertension, indicators of this serious complication are proteinuria and excessive oedema. Symptoms are rarely experienced until the disease is advanced, when the mother may suffer frontal headaches, visual disturbances, upper abdominal or epigastric pain and vomiting. Eclampsia (a severe form of pre-eclampsia that can include having fits) can cause premature detachment of the placenta from the womb, and damage to the major organs, including the pregnant woman's eyes. Its cause is unclear.

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Pre-eclampsia often accelerates more dramatically if it occurs in the middle trimester. Pre-eclampsia or eclampsia can also occur during labour and the postnatal period. Occasionally eclampsia may occur in a woman with no previous symptoms of pre-eclampsia.

Thromboembolism Thromboembolism is six times more likely in pregnancy and it is the leading cause of maternal deaths in the United Kingdom. Around half of cases occur in the first three months of pregnancy.

Oedema Oedema is common in normal pregnancies, affecting more than 80 per cent of women. Increased blood volume pushes fluid out of blood vessels into the tissues. Oedema can be exacerbated by tight clothing. It is no longer considered to be a major indicator of pre-eclampsia and usually disappears after delivery.

Breathlessness Oxygen consumption increases by about 20 per cent during pregnancy, mostly to maintain additional metabolic requirements. Many pregnant women feel breathless possibly due to the extra work of increased respiration and a change in the shape of the thorax making breathing more difficult. If a pregnant woman becomes suddenly breathless, cyanotic or coughs up blood, she should be urgently referred to her GP.

Heartburn Heartburn is particularly common in the later stages of pregnancy. It is related to pressure from the growing fetus and hor-

monal changes which decrease pressure in the lower oesophageal sphincter and slow peristaltic waves in the lower oesophagus.

Appetite and weight gain In the early stages, appetite may be lost but the majority of pregnant women will experience increased appetite at some stage during their pregnancy in response to the metabolic demands of the growing fetus. Many women also develop cravings or aversions for certain foods. Weight gain averages around 12kg. This is mostly attributable to the fetoplacental unit, extra blood, body fluid and fat deposits. Weight used to be recorded as part of antenatal care but is now not generally thought to be relevant, unless excessive weight gain or loss occurs.

Constipation and haemorrhoids Constipation affects over a third of pregnant women, particularly in the last three months. It is caused by the reduced bowel movements that occur to allow more fluid to be absorbed during digestion (more fluid is needed for increased plasma volume and circulation). This leads to less regular defaecation and harder stools. Constipation can aggravate haemorrhoids, as can the prolonged "bearing down" during delivery.

Backache The hormone relaxin (produced by the placenta) softens the connective tissues of the pregnant woman's body. This enables the joints in the spine and pelvis to become more flexible and the ligaments supporting the uterus to expand for the birth. The increased mobility of the joints can lead to discomfort in the pelvic area, but backache is more often due to a natural tendency for the woman to adopt a lardosis posture (bending back at the lower spine) to compensate for the extra weight carried at the front of the torso.

Cramp Cramp is common in pregnancy, mostly at night. The causes are unclear but may be linked to magnesium levels.

Hyperpigmentation and stretch marks Increased pigmentation is probably due to hormonal changes. It usually affects the nipples, areolae, and vulval and perianal regions, but can also affect the face. This diminishes after pregnancy. Stretch marks tend to occur more in fair-skinned women and where skin elasticity is poor. Physiological reasons include weight gain.

EMBRYONIC/FETAL DEVELOPMENT

The time from conception to 17 days after conception is called the "pre-embryonic phase", during which the fertilised egg undergoes cell division. From weeks three to eight the embryo begins to take a human shape. By the end of week eight it embarks on the fetal stage of development when tissues mature to a functional state and bone is laid down. Panel 1 gives a summary of development.

ANTENATAL CARE

If a pregnancy test result is positive, the woman should let her GP or a midwife know so that her antenatal care can be arranged. The purposes of antenatal care are to monitor the health of the mother during the pregnancy and to check that the fetus is developing normally. It is also an opportunity for the mother to learn about what is happening to her body and help prepare her for pregnancy, labour and the postnatal period. Approaches to antenatal care vary regionally,

PANEL 1: SUMMARY OF FETAL DEVELOPMENT DURING PREGNANCY¹

0–4 weeks after conception Limb buds and a primitive central nervous system forms. The heart develops and begins to beat.

4–8 weeks Cell division is rapid. All major organs are laid down in primitive form and head and facial features develop. External genitalia are present but sex is not distinguishable. The fetus shows early movements. From 6 weeks, the fetus is visible on ultrasound.

8–12 weeks Eyelids fuse and sex is apparent. Fetal circulation starts functioning and some primitive reflexes are present. Sucking and swallowing begin and the fetus moves freely (not felt by mother). The kidneys begin to function and the fetus passes urine from 10 weeks.

12–16 weeks Rapid skeletal development is visible on x-ray. Meconium (sticky stool) is present in the gut and lanugo (a fine downy hair) appears. Nasal septum and palate fuse.

16–20 weeks The mother feels fetal movements ("quickening") and the fetal heart can be heard with a stethoscope. Fingernails can be seen and skin cells begin to be renewed.

20–24 weeks Most organs are capable of functioning. The fetus grows through periods of sleep and activity and responds to sound. Its skin is red and wrinkled.

24–28 weeks At this stage, survival may be expected if the baby is born. Eyelids reopen and there are respiratory movements.

28–32 weeks The fetus begins to store fat and iron. Lanugo disappears from the face and the skin becomes paler and less wrinkled. In males, the testes descend into the scrotum.

32–36 weeks Fat storage makes the body more rounded. Lanugo disappears from the body, head hair lengthens and the nails reach the tips of the fingers. Creases on the soles of the feet are visible.

36–40 weeks after conception (38–42 weeks after LMP) The baby's contours are rounded and its skull is firm. Term is reached and birth is due.

but there are five main models of care available in Britain today:

- Home birth: The woman is cared for primarily by community midwives, some with GP support, and may consult an obstetrician, but usually only if there is a problem
- Consultant unit care: The woman is cared for by midwives and obstetric staff at a consultant unit
- Shared care: The woman receives an agreed part of her antenatal care from consultant unit staff and the rest from her GP or community midwife or both. Shared care is community based but the birth is in a hospital or birth centre and the mother has her early postnatal care there before returning under the care of her GP and community midwife
- Midwife-led care: The woman receives all her maternity care from community midwives
- Birth centres: The woman receives care from her midwife and GP, and gives birth in a small birth centre. This is primarily designed for women with straightforward pregnancies

The traditional timings of antenatal visits for a woman having her first baby are as follows, though this may vary according to the woman's needs and progress:

- Monthly, from 12 to 28 weeks (with an extra visit at 18 weeks for a scan)
- Fortnightly, from 28 to 36 weeks
- After 36 weeks, every week until the baby is born

In the first ("booking") interview the expected date of delivery (EDD) is established. The EDD is calculated by adding nine calendar months and seven days (around 280 days in total) to the date of the first day of the last menstrual period (LMP). However, this method can only be used when the woman can give an accurate account of her menstrual history and may need to be adjusted according to the length of her cycle. The use of combined oral contraceptives or the presence of bleeding in early pregnancy can also limit the use of this method. An ultrasound may then be needed to date the pregnancy. Establishing EDD is important because it prevents confusion in later pregnancy should there be a suspicion of poor fetal growth.

Routine clinical examination involves a general observation of the mother's health and will include examination for the main detectable problems of pregnancy such as hypertension, pre-eclampsia, oedema and anaemia. It will include blood pressure checks and urinalysis and an assessment of the woman's psychological, physical, social and educational needs.

SCREENING TESTS AND INVESTIGATIONS

Ultrasonography The majority of maternity hospitals in the UK perform an ultrasound scan in the first three months of pregnancy to check the viability of the fetus, confirm or establish EDD and exclude multiple pregnancy and fetal anomalies. The policy of some obstetricians, however, is to order an ultrasound scan routinely between 18 and 20 weeks' gestation. At this point the fetus is sufficiently large for all the major systems to be examined for any defects. Ultrasonography is also used to determine the fetal position, confirm or exclude an extra-uterine pregnancy, determine placental localisation (a low-lying placenta may complicate birth) and to confirm or exclude the presence of an associated abdominal mass (eg, fibroids).

Fetal nuchal translucency screening Abnormal free fluid present in an area behind the fetal neck can be detected from 10–14 weeks' gestation. Combined with maternal age, the fetal nuchal translucency can be used to estimate the risk of trisomy (occurrence of an extra chromosome), especially Down's syndrome. If a nuchal translucency of more than 3mm is visualised, other minor markers are checked.

Alpha-feto-protein test Also known as the maternal serum screening test, Barts or triple test, the alpha-feto-protein (AFP) test is used to assess the risk of Down's syndrome (it can detect 60 per cent of Down's syndrome fetuses) and neural tube defects (eg, spina bifida). The process involves taking a sample of blood from the mother to

action : practice points

1. Get to know your community midwives and talk to them about what advice they like to give and why.
2. Reflect on your response to symptoms associated with pregnancy. Did you incorporate any of the information in this article?
3. Speak to a pregnant woman about what antenatal care she has had and whether or not she finds it satisfactory.

evaluate

How could your learning have been more effective?
What will you do now and how will this be achieved?

ascertain AFP, oestriol and human chorionic gonadotrophin levels. Risk is estimated using this information and the woman's age.

The optimal time for taking the maternal blood sample is at 15–22 weeks' gestation, so it is important to date the pregnancy accurately. An abnormal reading may indicate the possibility of problems but alone is not conclusive and the mother will usually be called back for a second blood test. If a second blood test gives another abnormal reading amniocentesis is offered as a more accurate indicator.

Amniocentesis Amniocentesis tests a sample of amniotic fluid from the uterus and is the most practised simple invasive procedure in antenatal screening. It involves capturing shed skin cells from the fetus in order to culture these (a process taking up to four weeks) to establish the fetus' sex and chromosome profile. Normally carried out at 14–16 weeks, it is extremely accurate in detecting Down's syndrome and neural tube defects. The major risk of amniocentesis is miscarriage and this occurs in 0.5–1 per cent of procedures. Amniocentesis is usually offered if the mother has had an abnormal AFP result, if she is in her mid to late 30s or if there is a family history of genetic problems.

Chorionic villus sampling Chorionic villus sampling (CVS or placental biopsy) can be used to detect the same sorts of chromosomal abnormality as an amniocentesis, but it can also detect genetic disorders such as thalassaemia and sickle-cell anaemia and is usually carried out at 10 weeks for women with a family history of genetic disease or for those who have had a baby with a chromosomal abnormality. It involves drawing cells off from the placenta. CVS has a miscarriage risk of 2–3 per cent.

Doppler ultrasound Doppler ultrasound is used to identify and record fetal heart pulsation and can be a useful technique for evaluating fetal well-being in high-risk pregnancies. An abnormal test signifies that the fetus is growth-retarded due to uteroplacental insufficiency.

Percutaneous umbilical blood sampling Percutaneous umbilical blood sampling (PUBS or cordocentesis) of the fetal blood from 17 weeks is carried out when information about the fetus is required urgently.

REFERENCES

1. Bennett VR, Brown LK, editors. Myles textbook for midwives. 13th Ed. London: Churchill Livingstone; 1999.

FURTHER READING

- Tucker G, editor. The National Childbirth Trust book of pregnancy birth and parenthood. 2nd ed. Oxford: Oxford University Press; 1996.