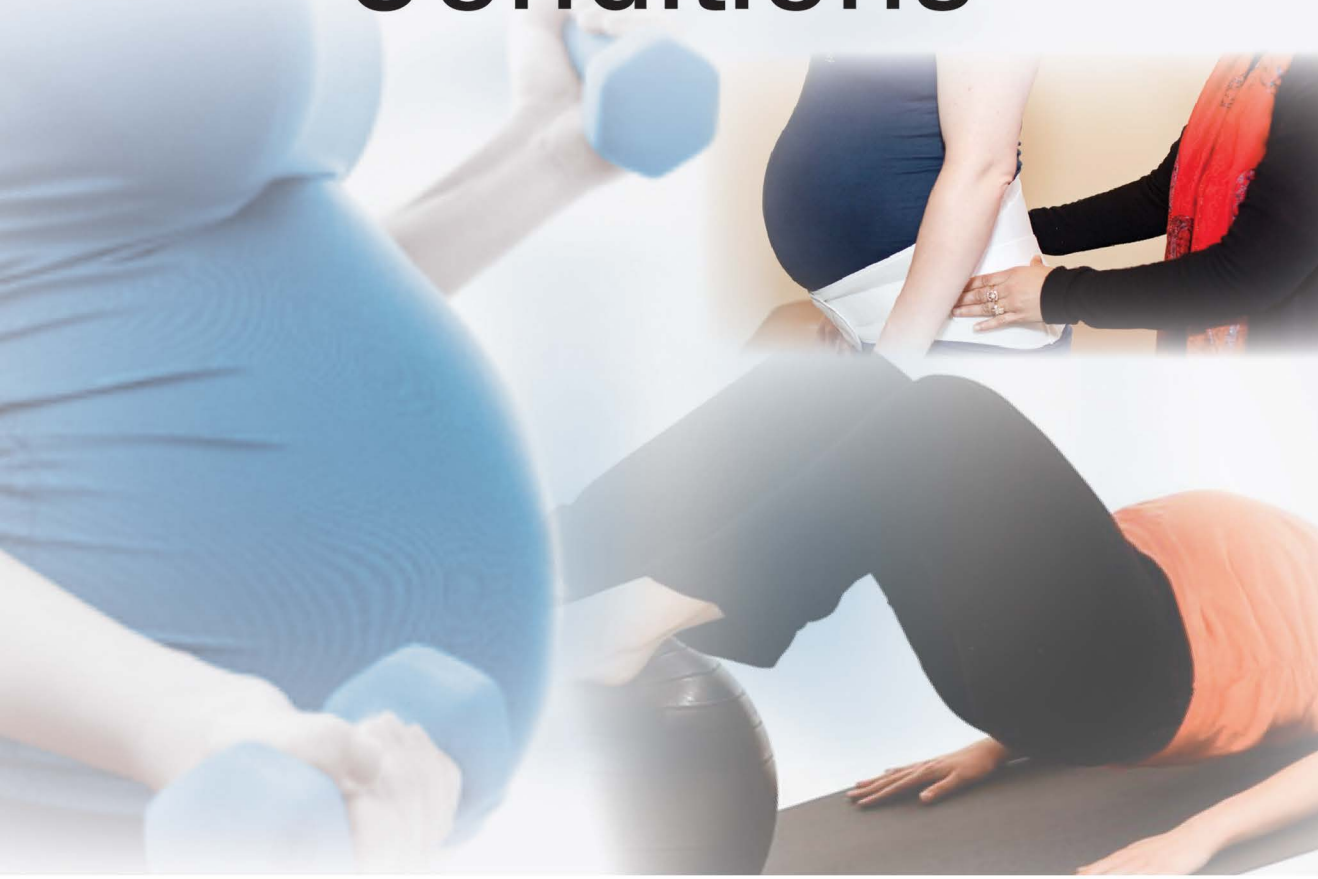
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Role of Physiotherapist in Obstetric and Gynecological Conditions



Purvi K Changela

JAYPEE

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Chapter 4

Pregnancy Tests and Special Investigations

Chapter Outline

- Clinical manifestations of early pregnancy
- Diagnosis of pregnancy
- First trimester
- Second trimester
- Third trimester
- Screening tests during pregnancy

INTRODUCTION

- Diagnosis of pregnancy and knowledge of normal findings associated with early pregnancy are common issues in the medical care of reproductive age women.
- Early diagnosis of pregnancy may prompt women to seek prenatal care earlier and take measures that can benefit the fetus and mother. Early diagnosis also provides the best opportunity for accurate estimation of gestational age.
- The diagnosis of early pregnancy is based primarily upon laboratory assessment of the presence of human chorionic gonadotropin (hCG) in urine or blood.
- History and physical examination are not highly sensitive methods of diagnosis, but knowledge of the characteristic findings of a normal pregnancy can be helpful in alerting the clinician to the possibility of an abnormal pregnancy, such as ectopic pregnancy, or the presence of coexistent disorders.

CLINICAL MANIFESTATIONS OF EARLY PREGNANCY

- In a study that prospectively collected data on the onset of pregnancy symptoms in 221 women attempting to conceive, 60% of women experienced some signs or symptoms of pregnancy as early as 5–6 weeks of gestation (i.e. 5–6 weeks after the first day of their last menstrual period [LMP]), and 90% were symptomatic by 8 weeks.
- The symptoms and signs are usually due to pregnancy, but none are diagnostic Table 4.1. A record of the time and frequency of coitus is helpful for diagnosing and dating a pregnancy.

DIAGNOSIS OF PREGNANCY

- The diagnosis of pregnancy requires a multifaceted approach using three main diagnostic tools. These are:
  1. History and physical examination
  2. Laboratory evaluation, and
  3. Ultrasonography.
- Currently, physicians may use all of these tools to diagnose pregnancy at early gestation and to help rule out other pathologies.

History and Physical Examination

- Physical signs suggestive of early pregnancy mention in the table below (Table 4.1)

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Table 4.1 Clinical manifestations of early pregnancy

Symptoms	*Signs*	*Investigations*
• Amenorrhea • Nausea and/or vomiting • Breast tenderness • Urinary frequency • Fatigue	• Softening of the cervix (Goodell's sign): 4–6 weeks • Bluish discoloration of the cervix and vagina due to engorgement of Pelvic vasculature (Chadwick's sign): 6 weeks • Uterine enlargement • Softening of the isthmus (Hegar's sign): 6–8 weeks	ß-hCG • Positive in the serum at 9 days post-conception • Positive in the urine 28 days after LMP (last menstrual period) **Transvaginal U/S** • 5 weeks: gestational sac visible (ß-hCG = 1,200-1,500 mIU/mL) • 6 weeks: fetal pole seen • 7–8 weeks: fetal heart tones visible **Transabdominal U/S** • 6–8 weeks: intrauterine pregnancy visible (ß-hCG = 6,500 mIU/mL)

occur around 6 weeks' of gestation. Like historical factors, physical signs during the first trimester are unreliable predictors of pregnancy. Although fairly specific, physical signs lack sensitivity.

- Investigators have examined the value of historical factors in the diagnosis of pregnancy among women who request hCG testing. The sensitivity of reported signs and symptoms such as breast tenderness, missed menses, amenorrhea, and morning sickness was in the range of 30–70%.
- Enlargement of the uterus begins shortly after implantation and, after about 4 weeks' gestation, the rate of enlargement is approximately 1 cm per week. As a result, clinicians can perform a bimanual examination to generate a rough estimate of gestational age.
- The last menstrual period (LMP) system of gestational dating is based on an "ideal" 28-day cycle, with fertilization occurring on day 14. Dating by LMP is most reliable if the patient consistently records normal monthly cycles interrupted by the sudden cessation of menses. However, only about 15% of reproductive-aged women have the idealized 28-day cycle, and approximately 25% of pregnant women bleed during the first trimester. However, a number of extenuating factors, such as obesity, extreme uterine retroversion, and fibroids, may compromise accurate uterine sizing in early pregnancy.

Laboratory Evaluation

In the 1st trimester, pregnancy is confirmed by urine test. The estimation of serum β-hCG for the confirmation of pregnancy is expensive, time consuming and not required as a routine measure.

Ultrasonography

- The technique of transabdominal ultrasono-graphy has been used with great accuracy as a means for pregnancy diagnosis and estimation of fetal numbers over the many years.
- Ultrasound is easier, noninvasive and very specific in the diagnosis of a live pregnancy, blighted ova, ectopic pregnancy and multiple pregnancy. Routine ultrasound at 18 weeks confirms the gestational age, monitor the fetal growth and judge the fetal well being by its biophysical profile.

FIRST TRIMESTER

Symptoms

During pregnancy, the body undergoes a number of changes as the baby develops inside the womb which can cause various symptoms, but they aren't usually serious.

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They tend to disappear during pregnancy or soon after birth, without any treatment. Here is a list of the most common symptoms.

Amenorrhea
It is an absence or stoppage of menses which is a presumptive symptom of pregnancy. Amenorrhea also affords the best method of calculating the duration of pregnancy and estimating the date of delivery.

Breasts Changes
Heaviness with pain over the breasts is due to increased vascularity. Breast becomes enlarged, nodular and tender. Around 10th week, Montgomery tubercle appears and by 12th weeks pigmentation starts.

Skin Changes
Colosma (brownish pigmentation over forehead and cheeks) develop and disappear after delivery.

Morning Sickness
The women is siezed with nausea on getting up in the morning. This lasts for a few hours and rarely end up in vomiting which is attributed to hCG hormons and charges in the gegeral metabolism. It rarely lasts beyond the 1st trimester.

Vaginal Discharge
A whitish, non-offensive and non irritating mucoid discharge results from estrogenic stimulation of endocervical mucosa, bluish discoloration (Chadwick sign).

Irritability of the Bladder
Irritability of the bladder and frequency of micturition without dysuria are caused by the gravid uterus pressing against the bladder. Once the uterus rises out of the pelvis, these symptoms subside.

Uterine Changes
Uterus is soft, enlarged, globular shape. (goodell's sign). Infrequent intermittent uterine contractions in 1st trimenster are known as palmer's sign. Uterus feel hard during contraction, lasts for 30 sec. and become soft again while relaxation. Body of uterus is enlarged and globular, isthmus and cervix soft and empty (Hegar's sign)

Pregnancy Tests

Hormonal Test

- A hormone, human chorionic gonadotrophin (hCG) is +nt in urine and blood of pregnant women
- Serum levels of this hormone rise linearly during the first 6 weeks of pregnancy.
- During this early stage of pregnancy, hCG levels double every 1–2 days which can be correlated with gestational age.
- Pregnant women with levels under 5,000 mIU/mL are unlikely to be over 42 days' gestation. Therefore, when ultrasonography is not available, measurement of ß-hCG may offer a potentially useful means of determining the gestational age criterion for eligibility for medical abortion.

Other alternative tests are:

- *Gravindex's test:* Simple, inexpensive test to perform and positive after 2 day's of missed period
- *Icon II test:* It highly sensitive detecting as low as 20m IU/ml of hCG around the missed period.
- *Pregnancy color test:* It relies on color change yieiding +ve result 10 days after missing period.
- *Radioimmunoassay (RIA):* Pregnancy can be recognized early by estimation of serum β-hCG (> 25 IU/L) around the time of implantation, before amenorrhea occurs (day 20 of gestation) which is called chemical or preclinical pregnancy.

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Ultrasound

It is an accurate method of determining certain abnormalities (e.g. spina bifida, anencephaly and cardiac abnormalities), where pregnancies are complicated by problems such as pregnancy induced hypertension (PIH), IUGR and antepartum hemorrhage, or where there is more than one fetus, a series of scans may be carried out.

SECOND TRIMESTER

Symptoms

- Amenorrhea continues but nausea, vomiting, and bladder symptom's clear up.
- Breast and abdomen continue to enlarge.
- Linea niagra becomes visible and fresh striae appear over abdominal skin.

Physical Examination

Fetal Movements (Quickening)

It can be felt by multigravida at around 18–20 weeks and in primigravida around 20–22 weeks.

Uterus

The uterus is palpable per abdomen and Braxton-hick's contraction are perceptible external ballottement can be demonstrated by the external pressure over abdomen. A small fetus in an sac containing amniotic fluid is displaced by these pressure and then it bounce back to it's previous position.

Investigations

Pregnancy test: Not useful in 2nd trimester

Ultrasound

- It has routine to perform an ultrasonic scanning at 18–20 weeks.
- To confirm the gestational age, to detect any fetal congenital malformation, fetal growth and presentation, cervical insufficiency, ectopic pregnancy, premature rupture of membranes or premature labor and evaluation of placental location for suspected placenta previa.

THIRD TRIMESTER

Symptoms

- Least diagnostic significance in 3rd trimester, as physical signs are obvious. Amenorrhea and breast enlargement continue, abdomen is enlarged, Braxton-hicks contractions are easily discernible as regular and frequent hardening and relaxation of uterus.
- The fetus is palpable and its lie, position and different parts are identified, fetal movement can be felt and the fetal heart rate (120–160 beats/min) can be auscultated.
- The fundus of uterus reaches the xiphisternum at the 36 weeks but sinks to the level seen at the 32nd week, if presenting parts get engaged. The pressure of gravid uterus on pelvic veins may cause edema of feet and worsening of varicose veins. Women complaint of dyspnea and palpitation near term, due to upward displacement of diaphragm.

Physical Examination

Fundal height

- After 26 weeks, the fundal height in cm divided by 3.5 equals lunar months.
- Fundal height alters with the amount of amniotic fluid and size of fetus. In primigravida, fetal head gets engaged by the 36th weeks, may remain free until the onset of labor. In multigravida, the head may get engaged only at the term or during early labor.

Ultrasonography: Ultrasound scanning required to assess fetal age, monitor its growth and assess fetal well-being by recording its biophysical profile (manning score) (Table 4.2).

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Table 4.2 Biophysical profile

Biophysical Attribute	*Normal*	*Abnormal*
Breathing	1 breathing episode within 30 minutes	No breathing episodes within 30 minutes
Movement	2 or more movements within 30 minutes	less than 2 movements within 30 minutes
Muscle tone	1 or more episodes of active extension/ flexion of limbs, etc. (i.e. opening and closing a hand).	Slow extension/ flexion of limbs, partially open fetal hand, etc.
Heart rate	2 or more episodes of reactive heart rate acceleration within 20 minutes	1 or more episodes of unreactive heart rate acceleration
Amniotic fluid	1 or more adequate pockets of fluid	Either no pockets or inadequate pockets of fluid

Uterine soufflé: At times, a soft blowing systolic murmur, synchronous with mother's pulse can be heard at the lower lateral border of uterus. Caused by blood flow in dilated uterine vessels.

Funic soufflé: Rarely, a blowing murmur, synchronous with the fetal heart, is heard over the mother's abdomen. It is heard if loop of the umbilical cord lying in front of the fetus gets compressed by the fetoscope.

SCREENING TESTS DURING PREGNANCY

- A considerable percentages of perinatal mortality and morbidity is attributed to congenital anomalies and genetic disorders. In the view of this, new investigatory procedures have been evolved to detect and manage such pregnancies.

  The aims of these investigations are to:

  1. Identify high-risk fetus.
  2. Monitor growth of the fetus and its well-being.
  3. Detect congenital anomalies not compatible with normal life.
- Selective procedures, appropriate to the case, should be employed to retain the benefits of such screening while making it cost effective. An investigatory procedure should be:
  - Safe
  - Non-invasive
  - Reliable
  - Cost-effectiveness

	Screening tests	*Diagnostic tests*
Who?	All pregnant women	Only "High Risks" women
Why?	Identify "high-risk" group	Diagnose abnormalities
What?	Blood tests, ultrasound, materal history including age	Amniocentesis, chorionic villus sampling
What are the Risks?	No risk to pregnancy. Anxiety if identified as "high-risks"	Miscarriage (1%)

- Pregnancy is the period of time when a fetus develops inside a woman's uterus and ends with the birth of the infant.
- Pregnancies typically involve a variety of clinical laboratory tests. The tests provide useful information from the time pregnancy is first considered through the initial days of the newborn's. It enables obstetricians to identify potential problems in the early stages of pregnancy which, if not addressed or treated, could result in increased risk for mother and baby.
- As with any test or procedure, antenatal testing and screening is undertaken following informed consent of the woman

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after adequate and appropriate counseling with regard to the implications, limitations and consequences of each investigation.

- The following Table 4.3 contain information on many of these routine and some less routine tests. The health care provider may recommend additional tests based on medical history.

The other screening tests are as mentioned below (Fig. 4.1).

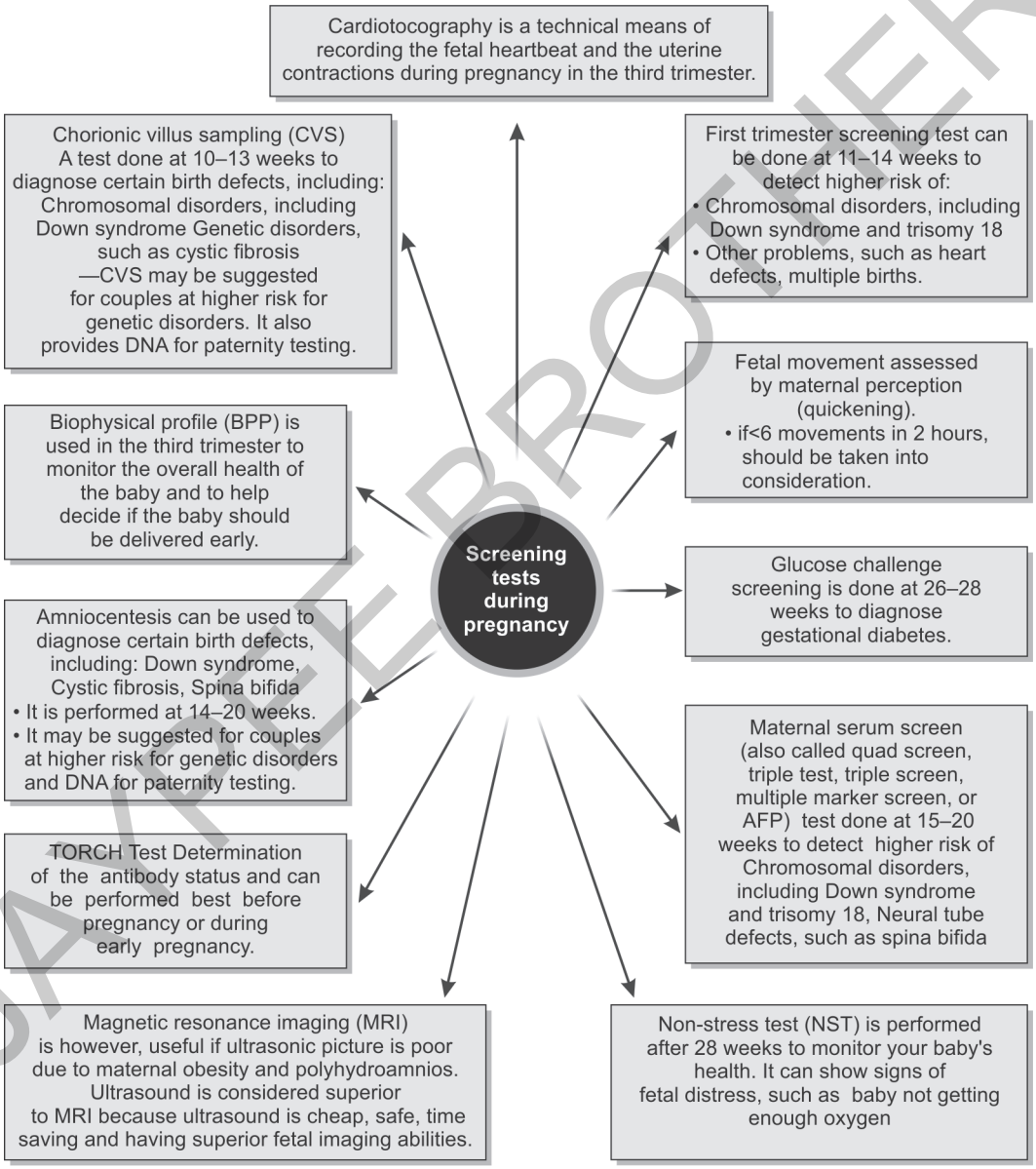


Fig. 4.1 Screening tests during pregnancy

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Table 4.3 Routine tests recommended during pregnancy

Gestational age (weeks)	*Management issues*
10–12	CVS U/S for nuchal translucency (if available)
15–16 or up to term	Amniocentesis
15	MSS (maternal serum screen)
16–18	U/S for dates and structural assessment Quickening (fetal movement felt by mother)
25–28	50g oral glucose challenge test (OGCT)
28	Repeat CBC Rhogam to Rh negative women
36	Rh antibody screen if indicated GBS screen
6 (postpartum)	Follow-up visit • Discuss contraception • Breast examination and pelvic examination, Pap smear • Depression/mental health

SUMMARY

- Diagnosis of pregnancy is an essential element of reproductive and sexual health services. Pregnancy testing is a service that may be offered in a variety of clinical settings, such as family planning clinics, young people's services, general practice and pharmacies.
- Pregnancy testing is carried out by biochemical means, using either a urine or blood sample. It is possible to diagnose through clinical examination, but only after 8–10 weeks of amenorrhea. The tests provide useful information from the time pregnancy is first considered through the initial days of the newborn's life.
- Appropriate clinical assessment and counseling should precede testing. It is essential to ensure that instructions about the test are fully complied with to ensure reliability and validity.
- Some special tests are performed at specified times throughout the pregnancy. Others are ordered as needed to detect and address conditions or problems that arise during pregnancy. Still others are offered to women who have increased risks because of their age or lifestyle and, finally, certain tests are selectively chosen based on the personal and family medical histories of the woman and her partner.
- The purposes of prenatal tests are to screen for and diagnose any existing problems that may affect the mother's or baby's health, identify and address problems as they arise, and assess the risk of a baby having a chromosomal or genetic abnormality.

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