ESSENTIALS of Maternity, Newborn, & Women's Health Nursing - **THIRD EDITION**

Susan Scott Ricci, **ARNP, MSN, MEd**

Learning Objectives

Upon completion of the chapter, you will be able to:

- **1.** Define the key terms used in this chapter.
- **2.** Relate the information typically collected at the initial prenatal visit.
- **3.** Select the assessments completed at follow-up prenatal visits.
- **4.** Evaluate the tests used to assess maternal and fetal well-being, including nursing management for each.
- **5.** Outline appropriate nursing management to promote maternal self-care and to minimize the common discomforts of pregnancy.
- **6.** Examine the key components of perinatal education.

KEY TERMS

alpha-fetoprotein

amniocentesis

biophysical profile (BPP)

chorionic villus sampling (CVS)

gravida

high-risk pregnancy

linea nigra

natural childbirth

para

perinatal education

preconception care

Linda and her husband, Rob, are eager to start a family within the next year. They are stable in their careers and financially secure. They decide to check out a new nurse-midwife practice associated with the local hospital, and they go for a preconception appointment. They leave their appointment overwhelmed with all the information they were given about having a healthy pregnancy.

WOW: *Words of Wisdom*

The secret of human touch is simple: showing a sincere liking and interest in people. Nurses need to use touch often.

Pregnancy is a time of many physiologic and psychological changes that can positively or negatively affect the woman, her fetus, and her family. Misconceptions, inadequate information, and unanswered questions about pregnancy, birth, and parenthood are common. The ultimate goal of any pregnancy is the birth of a healthy newborn, and nurses play a major role in helping the pregnant woman and her partner achieve this goal. Ongoing assessment and education are essential.

This chapter describes the nursing management required during pregnancy. It begins with a brief discussion of preconception care and then describes the assessment of the woman at the first prenatal visit and on follow-up visits. The chapter discusses tests commonly used to assess maternal and fetal well-being, including specific nursing management related to each test. The chapter also identifies important strategies to minimize the common discomforts of pregnancy and promote self-care. Lastly, the chapter discusses perinatal education, including childbirth education, birthing options, care provider options, preparation for breast-feeding or bottle feeding, and final preparation for labor and birth.

PRECONCEPTION CARE

Ideally, couples thinking about having a child should schedule a visit with their health care provider for preconception counseling to ensure that they are in the best possible state of health before pregnancy. **Preconception care** is the promotion of the health and well-being of a woman and her partner before pregnancy. The goal of preconception care is to identify and modify biomedical, behavioral, and social risks to a woman's health or pregnancy outcome through prevention and management interventions (Centers for Disease Control and Prevention [CDC], 2012a).

Preconception care should occur any time any health care provider sees a woman of reproductive age. Personal and family history, physical examination, laboratory screening, reproductive plan, nutrition, supplements, weight, exercise, vaccinations, and injury prevention should be reviewed in all women. Encourage folic acid 400 mcg per day, as well as proper diet and exercise. Women should receive the influenza vaccine if planning pregnancy during flu season; the rubella and varicella vaccines if there is no evidence of immunity to these viruses; and tetanus/diphtheria/pertussis if lacking adult vaccination. Offer specific interventions to reduce morbidity and mortality for both the woman who has been identified with chronic diseases or exposed to teratogens or illicit substances and her baby. Several interventions have been proven to effectively improve pregnancy outcome when provided as preconception care. Recent research suggests that events that occur in the uterine decidua, even before a woman knows she is pregnant, may have a significant impact on fetal growth and the outcome of pregnancy. With this in mind, shifting the focus on the periconceptual period and the very early stages of pregnancy should offer significant benefits to the health of both the mother and her infant. The overall aim should be to effectively use every pregnancy as the health care opportunity of two lifetimes (Saravelos & Regan, 2011).

The CDC (2012b) formulated 10 guidelines for preconception care (see **Box 12.1**).

BOX 12.1: TEN GUIDELINES FOR PRECONCEPTION CARE

- **Recommendation 1.** Individual responsibility across the lifespan: Each woman, man, and couple should be encouraged to have a reproductive life plan.
- **Recommendation 2.** Consumer awareness: Increase public awareness of the importance of preconception health behaviors and preconception care services by using information and tools appropriate across various ages; literacy, including health literacy; and cultural/linguistic contexts.
- **Recommendation 3.** Preventive visits: As a part of primary care visits, provide risk assessment and educational and health promotion counseling to all women of childbearing age to reduce reproductive risks and improve pregnancy outcomes.
- **Recommendation 4.** Interventions for identified risks: Increase the proportion of women who receive interventions as follow-up to preconception risk screening, focusing on high-priority interventions (i.e., those with evidence of effectiveness and greatest potential impact).
- **Recommendation 5.** Interconception care: Use the interconception period to provide additional intensive interventions to women who have had a previous pregnancy that ended in an adverse outcome (i.e., infant death, fetal loss, birth defects, low birth weight, or preterm birth).
- **Recommendation 6.** Prepregnancy checkup: Offer, as a component of maternity care, one prepregnancy visit for couples and persons planning pregnancy.
- **Recommendation 7.** Health insurance coverage for women with low incomes: Increase public and private health insurance coverage for women with low incomes to improve access to preventive women's health and preconception and interconception care.
- **Recommendation 8.** Public health programs and strategies: Integrate components of preconception health into existing local public health and related programs, including emphasis on interconception interventions for women with previous adverse outcomes.
- **Recommendation 9.** Research: Increase the evidence base and promote the use of the evidence to improve preconception health.
- **Recommendation 10.** Monitoring improvements: Maximize public health surveillance and related research mechanisms to monitor preconception health.

Adapted from Centers for Disease Control and Prevention. (2012b). *Preconception care questions and answers: Professionals*. Retrieved from **http://www.cdc.gov/ncbddd/preconception/QandA_providers.htm**.

Risk Factors for Adverse Pregnancy Outcomes

Preconception care is just as important as prenatal care to reduce adverse pregnancy outcomes such as maternal and infant mortality, preterm births, and low-birth-weight infants. Adverse pregnancy outcomes constitute a major public health challenge: 13% of infants are born premature; 8.3% are born with low birth weight; 1 in 33 live births have major birth defects; and 32% of women suffer pregnancy complications (CDC, 2011a).

Risk factors for these adverse pregnancy outcomes are prevalent among women of reproductive age, as demonstrated by the following statistics:

- 13.4% of women smoke during pregnancy, contributing to fetal addiction to nicotine.
- 13% consume alcohol during pregnancy, leading to fetal alcohol spectrum disorder.
- 70% of women do not take folic acid supplements, increasing the risk of neural tube defects in the newborn. Taking folic acid reduces the incidence of neural tube defects by two thirds.
- 32% of women starting a pregnancy are obese, which may increase their risk of developing hypertension, diabetes, and thromboembolic disease and may increase the need for cesarean birth.
- 3% take prescription or over-the-counter drugs that are known teratogens (substances harmful to the developing fetus).
- 5% of women have preexisting medical conditions that can negatively affect pregnancy if unmanaged (CDC, 2011c).

All of the factors above pose risks to pregnancy and could be addressed with early interventions if the woman sought preconception health care. Specific recognized risk factors for adverse pregnancy outcomes that fall into one or more of the above categories are listed in **Box 12.2**.

BOX 12.2: RISK FACTORS FOR ADVERSE PREGNANCY OUTCOMES

- **Isotretinoins.** Use of isotretinoins (e.g., Accutane®) in pregnancy to treat acne can result in miscarriage and birth defects. Effective pregnancy prevention should be implemented to avoid unintended pregnancies among women with childbearing potential who use this medication.
- **Alcohol misuse.** No time during pregnancy is safe to drink alcohol, and harm can occur early, before a woman has realized that she is or might be pregnant. Fetal alcohol syndrome and other alcohol-related birth defects can be prevented if women cease intake of alcohol before conception.
- **Anti-epileptic drugs.** Certain anti-epileptic drugs are known teratogens (e.g., valproic acid). Recommendations suggest that before conception, women who are on a regimen of these drugs and who are contemplating pregnancy should be prescribed a lower dosage of these drugs.
- **Diabetes (preconception).** The threefold increase in the prevalence of birth defects among infants of women with type 1 and type 2 diabetes is substantially reduced through proper management of diabetes.
- **Folic acid deficiency.** Daily use of vitamin supplements containing folic acid (400 mcg) has been demonstrated to reduce the occurrence of neural tube defects by two thirds.
- **Hepatitis B.** Vaccination is recommended for men and women who are at risk for acquiring hepatitis B virus (HBV) infection. Preventing HBV infection in women of childbearing age prevents transmission of infection to infants and eliminates risk to the woman of HBV infection and sequelae, including hepatic failure, liver carcinoma, cirrhosis, and death.
- **HIV/AIDS.** If HIV infection is identified before conception, timely antiretroviral treatment can be administered, and women (or couples) can be given additional information that can help prevent mother-to-child transmission.

- **Hypothyroidism.** The dosages of Levothyroxine® required for treatment of hypothyroidism increase during early pregnancy. Levothyroxine® dosage needs to be adjusted for proper neurologic development of the fetus.
- **Maternal phenylketonuria (PKU).** Women diagnosed with PKU as infants have an increased risk for delivering neonates/infants with intellectual disability. However, this adverse outcome can be prevented when mothers adhere to a low-phenylalanine diet before conception and continue it throughout their pregnancy.
- **Rubella seronegativity.** Rubella vaccination provides protective seropositivity and prevents congenital rubella syndrome.
- **Obesity.** Adverse perinatal outcomes associated with maternal obesity include neural tube defects, preterm delivery, diabetes, cesarean section, and hypertensive and thromboembolic disease. Appropriate weight loss and nutritional intake before pregnancy reduce these risks.
- **Oral anticoagulant.** Warfarin, which is used for the control of blood clotting, has been demonstrated to be a teratogen. To avoid exposure to warfarin during early pregnancy, medications can be changed to a nonteratogenic anticoagulant before the onset of pregnancy.
- **STIs.** *Chlamydia trachomatis* and *Neisseria gonorrhoeae* have been strongly associated with ectopic pregnancy, infertility, and chronic pelvic pain. STIs during pregnancy might result in fetal death or substantial physical and developmental disabilities, including intellectual disability and blindness. Early screening and treatment prevents these adverse outcomes.
- **Smoking.** Preterm birth, low birth weight, and other adverse perinatal outcomes associated with maternal smoking in pregnancy can be prevented if women stop smoking before or during early pregnancy. Because only 20% of women successfully control tobacco dependency during pregnancy, cessation of smoking is recommended before pregnancy.

Adapted from Centers for Disease Control and Prevention. (2012a). *Preconception care*. Retrieved from **http://www.cdc.gov/ncbddd/preconception**; March of Dimes. (2011). *Pregnancy complications*. Retrieved from **https://www.marchofdimes.com/pnhec/188.asp**; National Institutes of Health. (2012). *Health problems in pregnancy*. Retrieved from **http://www.nlm.nih.gov/medlineplus/healthproblemsinpregnancy.html**; and Saravelos, S. H., & Regan, L. (2011). The importance of preconception counseling and early pregnancy monitoring. *Seminars in Reproductive Medicine, 29*(6), 557–568.

The period of greatest environmental sensitivity and consequent risk for the developing embryo is between days 17 and 56 after conception. The first prenatal visit, which is usually a month or later after a missed menstrual period, may occur too late to affect reproductive outcomes associated with abnormal organogenesis secondary to poor lifestyle choices. In some cases, such as with unplanned pregnancies, women may delay seeking health care because they deny that they are pregnant. Thus, commonly used prevention practices may begin too late to avert the morbidity and mortality associated with congenital anomalies and low birth weight (van der Zee et al., 2011).

What is the purpose of couples like Linda and Rob going for preconception counseling? What are the goals of preconception care for this couple?

Nursing Management

Preconception care involves obtaining a complete health history and physical examination of the woman and her partner. Key areas include:

- Immunization status of the woman
- Underlying medical conditions, such as cardiovascular and respiratory problems or genetic disorders
- Reproductive health data, such as pelvic examinations, use of contraceptives, and sexually transmitted infections (STIs)
- Sexuality and sexual practices, such as safer-sex practices and body image issues
- Nutrition history and present status
- Lifestyle practices, including occupation and recreational activities
- Psychosocial issues such as levels of stress and exposure to abuse and violence
- Medication and drug use, including use of tobacco, alcohol, over-the-counter and prescription medications, and illicit drugs
- Support system, including family, friends, and community (**Fig. 12.1** gives a sample preconception screening tool.)

PRECONCEPTION SCREENING AND COUNSELING CHECKLIST

NAME	BIRTHPLACE	AGE

DATE: / / ARE YOU PLANNING TO GET PREGNANT IN THE NEXT SIX MONTHS? ___ Y ___N

IF YOUR ANSWER TO A QUESTION IS YES, PUT A CHECK MARK ON THE LINE IN FRONT OF THE QUESTION. FILL IN OTHER INFORMATION THAT APPLIES TO YOU.

DIET AND EXERCISE

What do you consider a healthy weight for you?_____
___Do you eat three meals a day?
___Do you follow a special diet (vegetarian, diabetic, other)?
___Which do you drink (__ coffee __ tea __ cola __ milk __ water __ soda/pop other_____)?
___Do you eat raw or undercooked food (meat, other)?
___Do you take folic acid?
___Do you take other vitamins daily (__ multivitamin __ vitamin A __ other)?
___Do you take dietary supplements (__ black cohosh __ pennyroyal __ other)?
___Do you have current/past problems withh eating disorders?
___Do you exercise? Type/frequency:_____

Notes:

LIFESTYLE

___Do you smoke cigarettes or use other tobacco products?
How many cigarettes/packs a day?_____
___Are you exposed to second-hand smoke?
___Do you drink alcohol?
What kind?_____How often?_____How much?_____
___Do you use recreational drugs (cocaine, heroin, ecstasy, meth/ice, other?
List:_____
___Do you see a dentist regularly?
What kind of work do you do?_____
___Do you work or live near possible hazards (chemicals, x-ray or other radiation, lead)? List:_____
___Do you use saunas or hot tubs?

Notes:

MEDICATION /DRUGS

___Are you taking prescribed drugs (Accutane, valproic acid, blood thinners)? List them_____
___Are you taking non-prescribed drugs?
List them:_____
___Are you using birth control pills?
___Do you get injectable contraceptives or shots for birth control?
___Do you use any herbal remedies or alternative medicine?
List:_____

NOTES:

MEDICAL/FAMILY HISTORY

Do you have or have you ever had:
___Epilepsy?
___Diabetes?
___Asthma?
___High blood pressure?
___Heart disease?
___Anemia?
___Kidney or bladder disorders?
___Thyroid disease?
___Chickenpox?
___Hepatitis C?
___Digestive problems?
___Depression or other mental health problem?
___Surgeries?
___Lupus?
___Scleroderma?
___Other conditions?
Have you ever been vaccinated for:
___Measles, mumps, rubella?
___Hepatitis B?
___Chickenpox?

NOTES:

WOMEN'S HEALTH

___Do you have any problems with your menstrual cycle?
___How many times have you been pregnant?
What was/ were the outcomes(s)?_____
___Did you have difficulty getting pregnant last time?
___Have you been treated for infertility?
Have you had surgery on your uterus, cervix, ovaries, or tubes?
___Did you mother take the hormone DES during pregnancy?
Have you ever had HPV, genital warts or chlamydia?
___Have you ever been treated for a sexually transmitted infection (genital herpes, gonorrhea, syphilis, HIV/AIDS, other)? List:_____

NOTES:

GENETICS

Does your family have a history of	Or	Your partner's family
___Hemophilia?		___
___Other bleeding disorders?		___
___Tay-Sachs disease?		___
___Blood diseases (sickle cell, thalassemia, other)?		___
___Muscular dystrophy?		___
___Down syndrome/mental retardation?		___
___Cystic fibrosis?		___
___Birth defects (spine/heart/kidney)?		___

Your ethnic background is:_____
Your partner's ethnic background is: _____

NOTES:

HOME ENVIRONMENT

___Do you feel emotionally supported at home?
___Do you have help from relatives or friends if needed?
___Do you feel you have serious money/financial worries?
___Are you in a stable relationship?
___Do you feel safe at home?
___Does anyone threaten or physically hurt you?
___Do you have pets (cats, rodents, exotic animals)? List:_____
___Do have any contact with soil, cat litter, or sandboxes?

Baby preparation (if planning pregnancy):
___Do you have a place for a baby to sleep?
___Do you need any baby items?

NOTES:

OTHER

IS THERE ANYTHING ELSE YOU'D LIKE ME TO KNOW?

ARE THERE ANY QUESTIONS YOU'D LIKE TO ASK ME?

FIGURE 12.1

Sample preconception screening tool. (Used with permission. Copyright March of Dimes.)

This information provides a foundation for planning health promotion activities and education. For example, to have a positive impact on the pregnancy:

- Ensure that the woman's immunizations are up to date.
- Create a reproductive life plan to address and outline their reproductive needs.
- Take a thorough history of both partners to identify any medical or genetic conditions that need treatment or a referral to specialists.
- Identify history of STIs and high-risk sexual practices so they can be modified.
- Complete a dietary history combined with nutritional counseling.
- Gather information regarding exercise and lifestyle practices to encourage daily exercise for well-being and weight maintenance.
- Stress the importance of taking folic acid to prevent neural tube defects.
- Urge the woman to achieve optimal weight before a pregnancy.
- Identify work environment and any needed changes to promote health.
- Address substance use issues, including smoking and drugs.
- Identify victims of violence and assist them to get help.
- Manage chronic conditions such as diabetes and asthma.
- Educate the couple about environmental hazards, including metals and herbs.
- Offer genetic counseling to identify carriers.
- Suggest the availability of support systems, if needed (Barry, 2011; Billingham, 2011).

Nurses can act as advocates and educators, creating healthy, supportive communities for women and their partners in the childbearing phases of their lives. It is important to enter into a collaborative partnership with the woman and her partner, enabling them to examine their own health and its influence on the health of their future baby. Provide information to allow the woman and her partner to make an informed decision about having a baby, but keep in mind that this decision rests solely with the couple. See **Evidence-Based Practice 12.1**.

EVIDENCE-BASED PRACTICE 12.1: PRECONCEPTION CARE FOR WOMEN WITH DIABETES TO IMPROVE MATERNAL AND INFANT HEALTH

STUDY

The association between hyperglycemia and congenital malformations was first recognized over 40 years ago and was followed by the development of preconception care for women with diabetes. Infants born to mothers with preexisting type 1 or type 2 diabetes mellitus are at greater risk of congenital anomalies, perinatal mortality, and significant morbidity in the short and long term. Pregnant women with preexisting diabetes are at greater risk of perinatal morbidity and diabetic complications. The relationship between glycemic control and health outcomes for both mothers and infants indicates the potential for preconception care for these women to be of benefit.

The objective of this study was to assess the effects of preconception care in women with preexisting diabetes on health outcomes for mother and her infant. The Cochrane Pregnancy and Childbirth Group's

Trials Register was searched and reference lists of retrieved articles. Randomized, quasi-randomized, and cluster-randomized trials evaluating preconception care of diabetic women were used.

Findings

Little evidence is available to recommend for or against preconception care for women with preexisting diabetes. Further large, high-quality randomized controlled trials are needed to evaluate the effect of different protocols of preconception care for women with preexisting diabetes.

Nursing Implications

At present there is support to provide preconception care where possible according to various guidelines. Little evidence was identified to recommend for or against any particular protocol of preconception care for women with preexisting diabetes. Nurses can continue to encourage all women with preexisting diabetes to obtain preconception care as part of her life reproductive plan to enhance the outcomes of her pregnancy and all of her future children.

Adapted from Tieu, J., Middleton, P., & Crowther, C. A. (2011) Preconception care for diabetic women for improving maternal and infant health. *Cochrane Database of Systematic Reviews 2011*(2). doi:10.1002/14651858.CD007776.pub2.

Take Note!

Because all women of reproductive age, from menarche to menopause, benefit from preventive care, preconception care should be an integral part of that continuum (Carruth & Archer, 2011).

Linda and Rob decide to change several aspects of their lifestyle and nutritional habits before conceiving a baby, based on advice from the nurse-midwife. They both want to lose weight, stop smoking, and increase their intake of fruits and vegetables. How will these lifestyle and dietary changes benefit Linda's future pregnancy? What other areas might need to be brought up to date to prepare for a future pregnancy?

THE FIRST PRENATAL VISIT

Once a pregnancy is suspected and, in some cases, tentatively confirmed by a home pregnancy test, the woman should seek prenatal care to promote a healthy outcome. Although the most opportune window (preconception) for improving pregnancy outcomes may be missed, appropriate nursing management starting at conception and continuing throughout the pregnancy can have a positive impact on the health of pregnant women and their unborn children.

The assessment process begins at this initial prenatal visit and continues throughout the pregnancy. The initial visit is an ideal time to screen for factors that might place the woman and her fetus at risk for problems such as preterm delivery. The initial visit also is an optimal time to begin educating the client about changes that will affect her life.

The International Association of Diabetes and Pregnancy Study Groups (IADPSG) recently issued recommendations on the diagnosis and classification of hyperglycemia in pregnancy. Specific recommendations for diagnosing hyperglycemic disorders in pregnancy include the following:

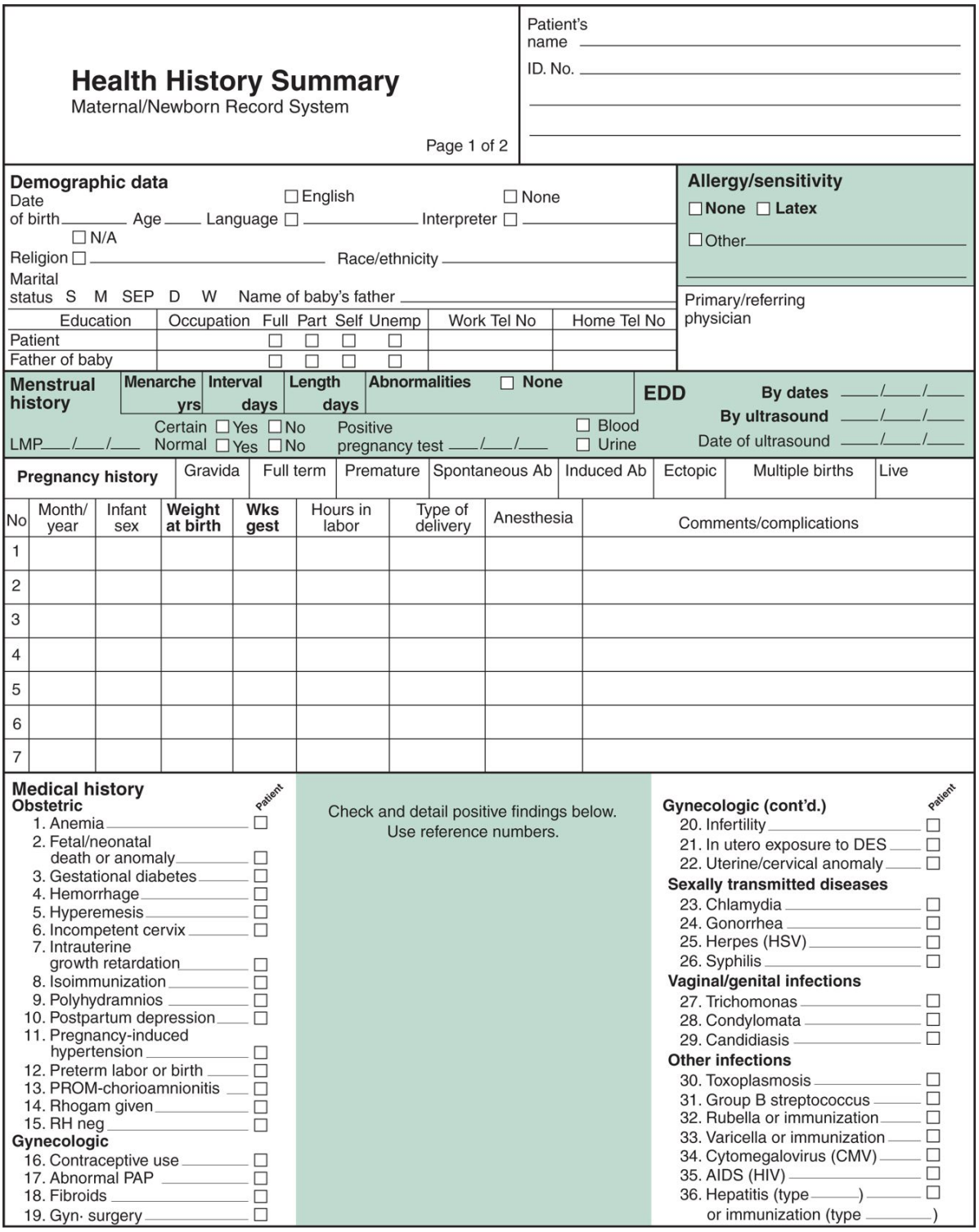
- At the *first prenatal visit,* only high-risk women should undergo testing of fasting plasma glucose hemoglobin A1c or random plasma glucose testing based on her risk factors, weight status, and family history.
- Thresholds for diagnosis of overt diabetes during pregnancy are:
  - Fasting plasma glucose: 126 mg/dL
  -
    - Hemoglobin A1c level: at least 6.5%
    - Random plasma glucose: 200 mg/dL
  - If glucose testing is not diagnostic of overt diabetes, the woman should be tested for gestational diabetes from 24 to 28 weeks of gestation with a 75-g oral glucose tolerance test (IADPSG, 2010).

Given our society's poor food choices, sedentary tendencies, obesity, increasing life stresses, and the increasing immigration of high-risk populations (Hispanic, Blacks, Southeast Asian, Arab, Afro-Caribbean, Mediterranean, and Native American), the incidence of gestational diabetes is growing. The American College of Obstetricians and Gynecologists (ACOG), the American Diabetes Association (ADA), and the World Health Organization have all recommended screening at the first prenatal visit for women who are over 25 years old, overweight, have polycystic ovary syndrome, history of gestational diabetes, and a positive family history of diabetes (Castorino & Jovanovič, 2011). Global guidelines for screening, diagnosis, and classification have been established, and offer the potential to stop the cycle of diabetes and obesity caused by hyperglycemia in pregnancy. Normoglycemia is the goal in all aspects of pregnancy and offers the benefits of decreased short-term and long-term complications of diabetes.

Counseling and education of the pregnant woman and her partner are critical to ensure healthy outcomes for mother and her infant. Pregnant women and their partners frequently have questions, misinformation, or misconceptions about what to eat, weight gain, physical discomforts, drug and alcohol use, sexuality, and the birthing process. The nurse needs to allow time to answer questions and provide anticipatory guidance during the pregnancy and to make appropriate community referrals to meet the needs of these clients. To address these issues and foster the overall well-being of pregnant women and their fetuses, specific national health goals have been established (see ***Healthy People 2020***).

Comprehensive Health History

During the initial visit, a comprehensive health history is obtained, including age, menstrual history, prior obstetric history, past medical and surgical history, family history, genetic screening, lifestyle and health practices, medication or drug use, and history of exposure to STIs (Weber & Kelley, 2010). Often, use of a prenatal history form (**Fig. 12.2**) is the best way to document the data collected.



Health History Summary

Maternal/Newborn Record System

Page 1 of 2

Patient's name _____

ID. No. _____

Demographic data

Date of birth _____ Age ____ ☐ N/A Language ☐ _____ ☐ English ☐ None Interpreter ☐ _____

Religion ☐ _____ Race/ethnicity _____

Marital status S M SEP D W Name of baby's father _____

Education	Occupation	Full	Part	Self	Unemp	Work Tel No	Home Tel No
Patient		☐	☐	☐	☐		
Father of baby		☐	☐	☐	☐		

Allergy/sensitivity

☐ **None** ☐ **Latex**

☐ Other _____

Primary/referring physician

Menstrual history

Menarche yrs	Interval days	Length days	Abnormalities ☐ None

LMP ___/___/___ Certain ☐ Yes ☐ No Normal ☐ Yes ☐ No Positive pregnancy test ___/___/___ ☐ Blood ☐ Urine

EDD **By dates** ___/___/___ **By ultrasound** ___/___/___ Date of ultrasound ___/___/___

Pregnancy history

Gravida	Full term	Premature	Spontaneous Ab	Induced Ab	Ectopic	Multiple births	Live

No	Month/ year	Infant sex	**Weight at birth**	**Wks gest**	Hours in labor	Type of delivery	Anesthesia	Comments/complications
1								
2								
3								
4								
5								
6								
7								

Medical history

Obstetric Patient

1. Anemia ☐
2. Fetal/neonatal death or anomaly ☐
3. Gestational diabetes ☐
4. Hemorrhage ☐
5. Hyperemesis ☐
6. Incompetent cervix ☐
7. Intrauterine growth retardation ☐
8. Isoimmunization ☐
9. Polyhydramnios ☐
10. Postpartum depression ☐
11. Pregnancy-induced hypertension ☐
12. Preterm labor or birth ☐
13. PROM-chorioamnionitis ☐
14. Rhogam given ☐
15. RH neg ☐

Gynecologic

16. Contraceptive use ☐
17. Abnormal PAP ☐
18. Fibroids ☐
19. Gyn· surgery ☐

Check and detail positive findings below. Use reference numbers.

Gynecologic (cont'd.) Patient

20. Infertility ☐
21. In utero exposure to DES ☐
22. Uterine/cervical anomaly ☐

Sexally transmitted diseases

23. Chlamydia ☐
24. Gonorrhea ☐
25. Herpes (HSV) ☐
26. Syphilis ☐

Vaginal/genital infections

27. Trichomonas ☐
28. Condylomata ☐
29. Candidiasis ☐

Other infections

30. Toxoplasmosis ☐
31. Group B streptococcus ☐
32. Rubella or immunization ☐
33. Varicella or immunization ☐
34. Cytomegalovirus (CMV) ☐
35. AIDS (HIV) ☐
36. Hepatitis (type ____) ☐ or immunization (type ____)

FIGURE 12.2

Sample prenatal history form. (Used with permission. Copyright Briggs Corporation, 2001.)

Health History Summary

Maternal/newborn record system

Page 2 of 2

Patient's name _____

ID. No. _____

Check and detail positive findings below. Use reference numbers.

Cardiovascular (Patient / Family)

37. Myocardial infarction ☐ ☐
38. Heart disease ☐ ☐
39. Rheumatic fever ☐
40. Valve disease ☐
41. Chronic hypertension ☐ ☐
42. Disease of the aorta ☐ ☐
43. Varicosities Thrombophlebitis ☐ ☐
44. Previous pulmonary embolism ☐
45. Blood disorders ☐ ☐
46. Anemia/ hemoglobinopathy ☐ ☐
47. Blood transfusions ☐
48. Other ☐

Pulmonary

49. Asthma ☐
50. Tuberculosis ☐ ☐
51. Chronic obstructive pulmonary disease ☐ ☐

Endocrine

52. Diabetes ☐ ☐
53. Thyroid dysfunction ☐ ☐
54. Maternal PKU ☐
55. Endocrinopathy ☐ ☐
56. Gastrointestinal ☐
57. Liver disease ☐

Renal disease (Patient / Family)

58. Cystitis ☐
59. Pyelonephritis ☐
60. Asymptomatic bacteriuria ☐
61. Chronic renal disease ☐ ☐
62. Autoimmune disease ☐ ☐
63. Cancer ☐ ☐

Neurologic disease

64. Cerebrovascular accident ☐ ☐
65. Seizure disorder ☐ ☐
66. Migraine headaches ☐ ☐
67. Degenerative disease ☐ ☐
68. Other ☐

Psychological/surgical

69. Psychiatric disease Mental lillness ☐ ☐
70. Physical abuse or neglect ☐ ☐
71. Emotional abuse or neglect ☐ ☐
72. Addiction ☐ (drug, alcohol, nicotine) ☐ ☐
73. Major accidents ☐
74. Surgery ☐
75. Anesthetic complications ☐
76. Non-surgical hospitalization ☐
77. Other ☐
78. **No known disease/problems** ☐

Genetic history (Patient / Father of baby / Family)

79. Age 35 or older (female) 50 or older (male) ☐ ☐ ☐
80. Cerebral palsy ☐ ☐ ☐
81. Cleft lip/palate ☐ ☐ ☐
82. Congenital anomalies ☐ ☐ ☐
83. Congenital heart disease ☐ ☐ ☐
84. Consanguinity ☐ ☐ ☐
85. Cystic fibrosis ☐ ☐ ☐
86. Down's syndrome ☐ ☐ ☐
87. Hemophilia ☐ ☐ ☐
88. Huntington's chorea ☐ ☐ ☐

(Patient / Father of baby / Family)

89. Mental retardation ☐ ☐ ☐
90. Muscular dystrophy ☐ ☐ ☐
91. Neural tube defect ☐ ☐ ☐
92. Sickle cell disease or trait ☐ ☐ ☐
93. Tay-sachs disease ☐ ☐ ☐
94. Test for fragile X ☐ ☐ ☐
95. Thalassemia A or B ☐ ☐ ☐
96. Other ☐ ☐ ☐
97. Other ☐ ☐ ☐
98. Other ☐ ☐ ☐

Historical risk status ☐ **No risk factors noted**

☐ **At risk (identify)**

Signature

The initial health history typically includes questions about three major areas: the reason for seeking care; the client's past medical, surgical, and personal history, including that of

the family and her partner; and the client's reproductive history. During the history-taking process, the nurse and client establish the foundation of a trusting relationship and jointly develop a plan of care for the pregnancy. Tailor this plan to the client's lifestyle as much as possible and focus primarily on education for overall wellness during the pregnancy. The ultimate goal for the first prenatal visit is to collect baseline data about the woman and her partner and to detect any risk factors that need to be addressed to facilitate a healthy pregnancy (Weber & Kelley, 2010).

12-1: *HEALTHY PEOPLE 2020*

Objective	Nursing Significance
MICH-10 Increase the proportion of pregnant women who receive early and adequate prenatal care by 10% over *HP 2010* goal.	Will contribute to reduced rates of perinatal illness, disability, and death by helping to identify possible risk factors and implementing measures to lessen these factors that contribute to poor outcomes
MICH-12 (Developmental) Increase the proportion of pregnant women who attend a series of prepared childbirth classes.	Will contribute to a more pleasant birthing experience because women will be prepared for what they will face; will also help in reducing pain and anxiety
MICH-13 (Developmental) Increase the proportion of mothers who achieve a recommended weight gain during their pregnancies.	Will reduce the risks associated with weight for better perinatal outcomes for mother and infant
MICH-16 Increase the proportion of women deliveringa live birth who received preconception care services and practiced key recommended preconception health behaviors: • Took multivitamins/folic acid prior to pregnancy Did not smoke prior to pregnancy Did not drink alcohol prior to pregnancy (Developmental) Used contraception to plan pregnancy	The risk of maternal and infant mortality and pregnancy-related complications can be reduced by increasing access to quality preconception care. This will enhance healthy birth outcomes and early identification and treatment of health.

Adapted from U.S. Department of Health and Human Services. (2010). *Healthy People 2020*. Retrieved from **http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=26**.

Reason for Seeking Care

The woman commonly comes for prenatal care based on the suspicion that she is pregnant. She may report that she has missed her menstrual period or has had a positive result on a home pregnancy test. Ask the woman for the date of her last menstrual period (LMP). Also ask about any presumptive or probable signs of pregnancy that she might be experiencing. Typically a urine or blood test to check for evidence of human chorionic gonadotropin (hCG) is done to confirm the pregnancy.

Past History

Ask about the woman's past medical and surgical history. This information is important because conditions that the woman experienced in the past (e.g., urinary tract infections) may recur or be exacerbated during pregnancy. Also, chronic illnesses, such as diabetes or heart disease, can increase the risk for complications during pregnancy for the woman and her fetus. Ask about any history of allergies to medications, foods, or environmental substances. Ask about any mental health problems, such as depression or anxiety. Gather similar information about the woman's family and her partner.

The woman's personal history also is important. Ask about her occupation, possible exposure to teratogens, exercise and activity level, recreational patterns (including the use of substances such as alcohol, tobacco, and drugs), use of alternative and complementary therapies, sleep patterns, nutritional habits, and general lifestyle. Each of these may have an impact on the outcome of the pregnancy. For example, if the woman smokes during pregnancy, nicotine in the cigarettes causes vasoconstriction in the mother, leading to reduced placental perfusion. As a result, the newborn may be small for gestational age. The newborn will also go through nicotine withdrawal soon after birth. In addition, no safe level of alcohol ingestion in pregnancy has been determined. Many fetuses exposed to heavy alcohol levels during pregnancy develop fetal alcohol syndrome, a collection of deformities and disabilities.

Reproductive History

The woman's reproductive history includes a menstrual, obstetric, and gynecologic history. Typically, this history begins with a description of the woman's menstrual cycle, including her age at menarche, number of days in her cycle, typical flow characteristics, and any discomfort experienced. The use of contraception also is important, including when the woman last used any contraception.

Establishing an accurate "due date" is one of the most important assessments for a pregnant woman, one that has both social and medical significance. For women and their families, this estimated date of birth (EDB) represents the long-awaited birthday of their child and is a time frame around which many economic and social activities are planned. This end point date provides guidance for the timing of specific maternal and fetal testing throughout pregnancy,

gauges fetal growth parameters, and provides well-established timelines for specific interventions in the management of prenatal complications. In fact, critical decisions, such as preterm labor management, timing of postdate induction of labor, and identification of intrauterine growth restriction, are all based on the presumed gestational age of the fetus, which is calculated backwards from the EDB (Kamath et al., 2011).

Ask the woman the date of her LMP to determine the estimated or expected date of birth (EDB). Several methods may be used to estimate the date of birth. Nagele's rule can be used to establish the EDB. Using this rule, subtract 3 months from the month of her LMP and then add 7 days to the first day of the LMP. Then correct the year by adding 1 to it where necessary. An alternative way is to add 7 days and then add 9 months = year where needed. This date has a margin of error of plus or minus 2 weeks. For instance, if a woman reports that her LMP was October 14, 2013, you would subtract 3 months (July) and add 7 days (21), then add 1 year (2014). The woman's EDB is July 21, 2014.

Because of the normal variations in women's menstrual cycles, differences in the normal length of gestation among ethnic groups, and errors in dating methods, there is no such thing as an exact due date. In general, a birth 2 weeks before or 2 weeks after the EDB is considered normal. Nagele's rule is less accurate if the woman's menstrual cycles are irregular, if the woman conceives while breast-feeding or before her regular menstrual cycle is establisher after childbirth, if she is ovulating although she is amenorrheic, or after she discontinues oral contraceptives (Schuiling, & Likis, 2013).

A gestational or birth calculator or wheel can also be used to calculate the due date (**Fig. 12.3**). Some practitioners use ultrasound to more accurately determine the gestational age and date the pregnancy. Ultrasound is typically the most accurate method of dating a pregnancy.

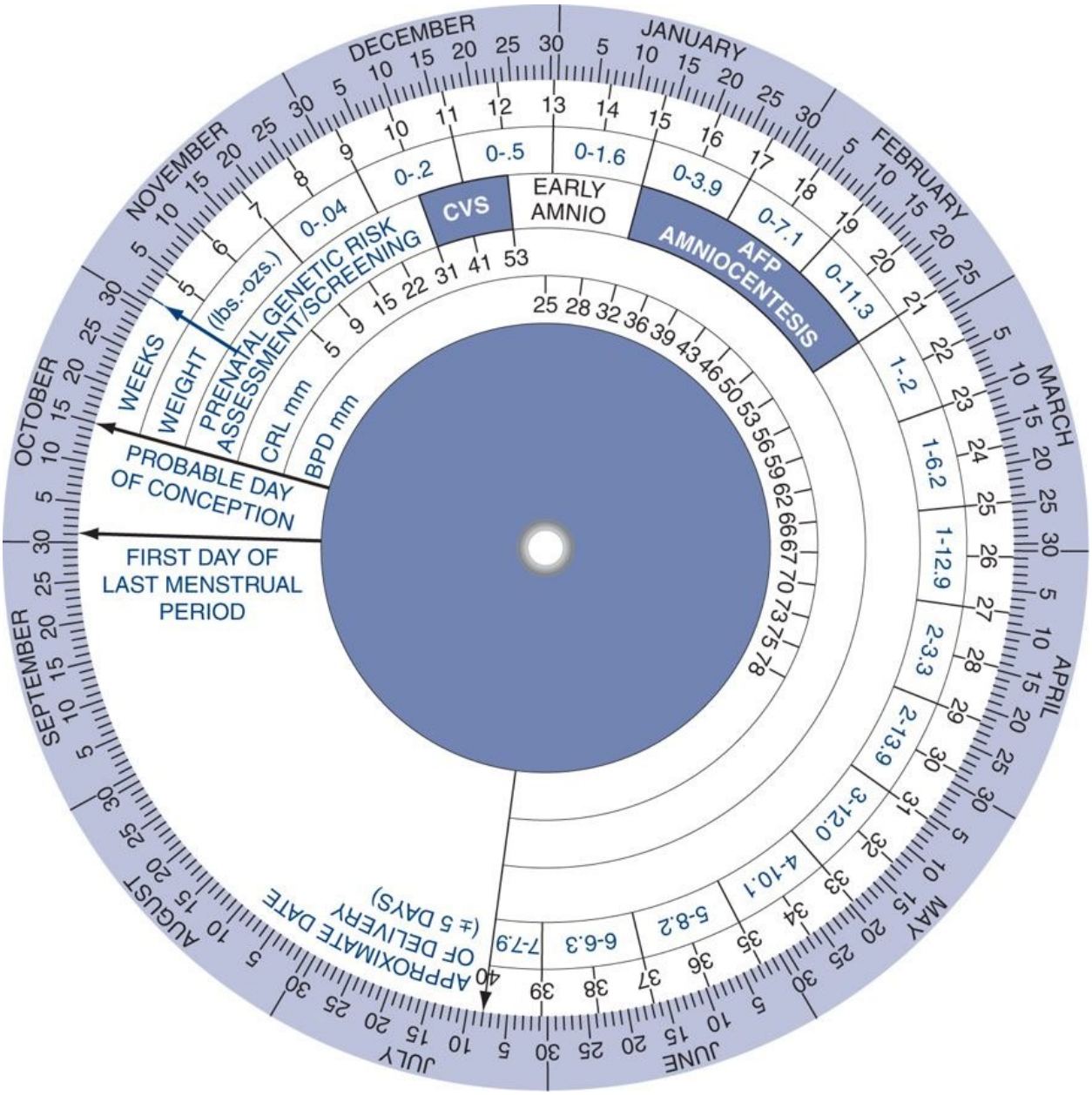


FIGURE 12.3

EDB using a birth wheel. The first day of the woman's last normal menstrual period was October 1. Using the birth wheel, her EDB would be approximately July 8 of the following year. (Used with permission. Copyright March of Dimes, 2007.)

Typically, an obstetric history provides information about the woman's past pregnancies, including any problems encountered during the pregnancy, labor, delivery, and afterward. Such information can provide clues to problems that might develop in the current pregnancy. Some common terms used to describe and document an obstetric history include:

- **Gravid**: the state of being pregnant

- **Gravida**: a pregnant woman; gravida I (primigravida) during the first pregnancy, gravida II (secundigravida) during the second pregnancy, and so on
- **Para**: The number of deliveries at 20 weeks or greater that a woman has, regardless of whether the newborn is born alive or dead. Thus, a primipara is a woman who has given birth once after a pregnancy of at least 20 weeks, commonly referred to as a "primip" in clinical practice. A multipara is a woman who has had two or more pregnancies resulting in viable offspring, commonly referred to as a "multip." Nullipara (para 0) is a woman who has not produced a viable offspring. (See **Table 12.1**.)

TABLE 12.1: PREGNANCY TERMS

Term	Definition
Gravid	The state of being pregnant
Gravida	Refers to a pregnant woman
Gravidity	Relates to the number of times that woman has been pregnant, irrespective of the outcome
Nulligravida	A woman who has never experienced pregnancy
Primigravida	A woman pregnant for the first time
Multigravida	A woman pregnant for at least the third time
Para	The number of deliveries at 20 weeks or greater
Parity	Refers to the number of pregnancies, not the number of fetuses, carried to the point of viability, regardless of the outcome
Multipara	A woman who has had two or more pregnancies resulting in viable offspring

Other systems may be used to document a woman's obstetric history. These systems often break down the category of para more specifically (**Box 12.3**).

BOX 12.3: OBSTETRIC HISTORY TERMS

GTPAL or TPAL

G = gravida, T = term births, P = preterm births, A = abortions, L = living children

- G—the current pregnancy to be included in count

- T—the number of term gestations delivering between 38 and 42 weeks
- P—the number of preterm pregnancies ending >20 weeks or viability but before completion of 37 weeks
- A—the number of pregnancies ending before 20 weeks or viability
- L—the number of children currently living

Consider this example: Mary Johnson is pregnant for the fourth time. She had one abortion at 8 weeks' gestation. She has a daughter who was born at 40 weeks' gestation and a son born at 34 weeks. Mary's obstetric history would be documented as follows:

Using the gravida/para method: gravida 4, para 2 Using the TPAL method: 1112 (T = 1 [daughter born at 40 weeks]; P = 1 [son born at 34 weeks]; A = 1 [abortion at 8 weeks]; L = 2 [two living children])

Information about the woman's gynecologic history is important. Ask about any reproductive tract surgeries the woman has undergone. For example, surgery on the uterus may affect its ability to contract effectively during labor. A history of tubal pregnancy increases the woman's risk for another tubal pregnancy. Also ask about safe-sex practices and any history of STIs.

Physical Examination

The next step in the assessment process is the physical examination, which detects any physical problems that may affect the pregnancy outcome. The initial physical examination provides the baseline for evaluating changes during future visits.

Preparation

Instruct the client to undress and put on a gown. Also ask her to empty her bladder and, in doing so, to collect a urine specimen. Typically this specimen is a clean-catch urine specimen that is sent to the laboratory for a urinalysis to detect a possible urinary tract infection.

Begin the physical examination by obtaining vital signs, including blood pressure, respiratory rate, temperature, and pulse. Also measure the client's height and weight. Abnormalities such as an elevated blood pressure may suggest pregestational hypertension, requiring further evaluation. Abnormalities in pulse rate and respiration require further investigation for possible cardiac or respiratory disease. If the woman weighs less than 100 pounds or more than 200 pounds or there has been a sudden weight gain, report these findings to the primary care provider; medical treatment or nutritional counseling may be necessary.

Head-to-Toe Assessment

A complete head-to-toe assessment is usually performed by the health care professional. Every body system is assessed. Some of the major areas are discussed here. Throughout the assessment, be sure to drape the client appropriately to ensure privacy and prevent chilling.

HEAD AND NECK

Assess the head and neck area for any previous injuries and sequelae. Evaluate for any limitations in range of motion. Palpate for any enlarged lymph nodes or swelling. Note any edema of the nasal mucosa or hypertrophy of gingival tissue in the mouth; these are typical responses to increased estrogen levels in pregnancy. Palpate the thyroid gland for enlargement. Slight enlargement is normal, but marked enlargement may indicate hyperthyroidism, requiring further investigation.

CHEST

Auscultate heart sounds, noting any abnormalities. A soft systolic murmur caused by the increase in blood volume may be noted. Anticipate an increase in heart rate by 10 to 15 beats per minute (bpm) (starting between 14 and 20 weeks of pregnancy) secondary to increases in cardiac output and blood volume. The body adapts to the increase in blood volume with peripheral dilation to maintain blood pressure. Progesterone causes peripheral dilation.

Auscultate the chest for breath sounds, which should be clear. Also note symmetry of chest movement and thoracic breathing patterns. Estrogen promotes relaxation of the ligaments and joints of the ribs, with a resulting increase in the anteroposterior chest diameter. Expect a slight increase in respiratory rate to accommodate the increase in tidal volume and oxygen consumption.

Inspect and palpate the breasts and nipples for symmetry and color. Increases in estrogen and progesterone and blood supply make the breasts feel full and more nodular, with increased sensitivity to touch. Blood vessels become more visible and there is an increase in breast size. Striae gravidarum (stretch marks) may be visible in women with large breasts. Darker pigmentation of the nipple and areola is present, along with enlargement of Montgomery's glands. Colostrum (yellowish secretion that precedes mature breast milk) is excreted typically in the third trimester.

ABDOMEN

The appearance of the abdomen depends on the number of weeks of gestation. The abdomen enlarges progressively as the fetus grows. Inspect the abdomen for striae, scars, and the shape and size. Inspection may reveal striae gravidarum (stretch marks) and **linea nigra**, a thin brownish black pigmented line running from the umbilicus to the symphysis pubis, depending on the duration of the pregnancy. Palpate the abdomen, which should be rounded and nontender. A decrease in muscle tone may be noted due to the influence of progesterone.

Typically, the height of the fundus is measured when the uterus arises out of the pelvis to evaluate fetal growth. At 12 weeks' gestation the fundus can be palpated at the symphysis pubis. At 16 weeks' gestation the fundus is midway between the symphysis and the umbilicus. At 20 weeks the fundus can be palpated at the umbilicus and measures approximately 20 cm from the symphysis pubis. By 36 weeks the fundus is just below the xiphoid process and measures

approximately 36 cm. The uterus maintains a globular/ovoid shape throughout pregnancy (Bope & Kellerman, 2012).

EXTREMITIES

Inspect and palpate both legs for dependent edema, pulses, and varicose veins. If edema is present in early pregnancy, further evaluation may be needed to rule out gestational hypertension. During the third trimester, dependent edema is a normal finding. Ask the woman if she has any pain in her calf that increases when she ambulates. This might indicate a deep vein thrombosis (DVT). High levels of estrogen during pregnancy place women at higher risk for DVT.

Pelvic Examination

The pelvic examination provides information about the internal and external reproductive organs. In addition, it aids in assessing some of the presumptive and probable signs of pregnancy and allows for determination of pelvic adequacy. During the pelvic examination, remain in the examining room to assist the health care provider with any specimen collection, fixation, and labeling. Also provide comfort and emotional support for the woman, who might be anxious. Throughout the examination, explain what is happening and why, and answer any questions as necessary.

EXTERNAL GENITALIA

After the client is placed in the lithotomy position and draped appropriately, the external genitalia are inspected visually. They should be free from lesions, discharge, hematomas, varicosities, and inflammation upon inspection. A culture for STIs may be collected at this time.

INTERNAL GENITALIA

Next, the internal genitalia are examined via a speculum. The cervix should be smooth, long, thick, and closed. Because of increased pelvic congestion, the cervix will be softened (Goodell's sign), the uterine isthmus will be softened (Hegar's sign), and there will be a bluish coloration of the cervix and vaginal mucosa (Chadwick's sign).

The uterus typically is pear shaped and mobile, with a smooth surface. It will undergo cell hypertrophy and hyperplasia so that it enlarges throughout the pregnancy to accommodate the growing fetus.

During the pelvic examination, a Papanicolaou (Pap) smear may be obtained. Additional cultures, such as for gonorrhea and chlamydia screening, also may be obtained. Ensure that all specimens obtained are labeled correctly and sent to the laboratory for evaluation. A rectal examination is done last to assess for lesions, masses, prolapse, or hemorrhoids.

Once the examination of the internal genitalia is completed and the speculum is removed, a bimanual examination is performed to estimate the size of the uterus to confirm dates and to palpate the ovaries. The ovaries should be small and nontender, without masses. At the conclusion of the bimanual examination, the health care professional reinserts the index finger into the vagina and the middle finger into the rectum to assess the strength and regularity of the posterior vaginal wall.

PELVIC SIZE, SHAPE, AND MEASUREMENTS

The size and shape of the women's pelvis can affect her ability to deliver vaginally. Pelvic shape is typically classified as one of four types: gynecoid, android, anthropoid, and platypelloid. Refer to **Chapter 13** for an in-depth discussion of pelvic size and shape.

Taking internal pelvic measurements determines the actual diameters of the inlet and outlet through which the fetus will pass. This is extremely important if the woman has never given birth vaginally. Taking pelvic measurements is unnecessary for the woman who has given birth vaginally before (unless she has experienced some type of trauma to the area) because vaginal delivery demonstrates that the pelvis is adequate for the passage of the fetus.

Three measurements are assessed: diagonal conjugate, true conjugate, and ischial tuberosity (**Fig. 12.4**). The diagonal conjugate is the distance between the anterior surface of the sacral prominence and the anterior surface of the inferior margin of the symphysis pubis (Bope & Kellerman, 2012). This measurement, usually 12.5 cm or greater, represents the anteroposterior diameter of the pelvic inlet through which the fetal head passes first. The diagonal conjugate is the most useful measurement for estimating pelvic size because a misfit with the fetal head occurs if it is too small.

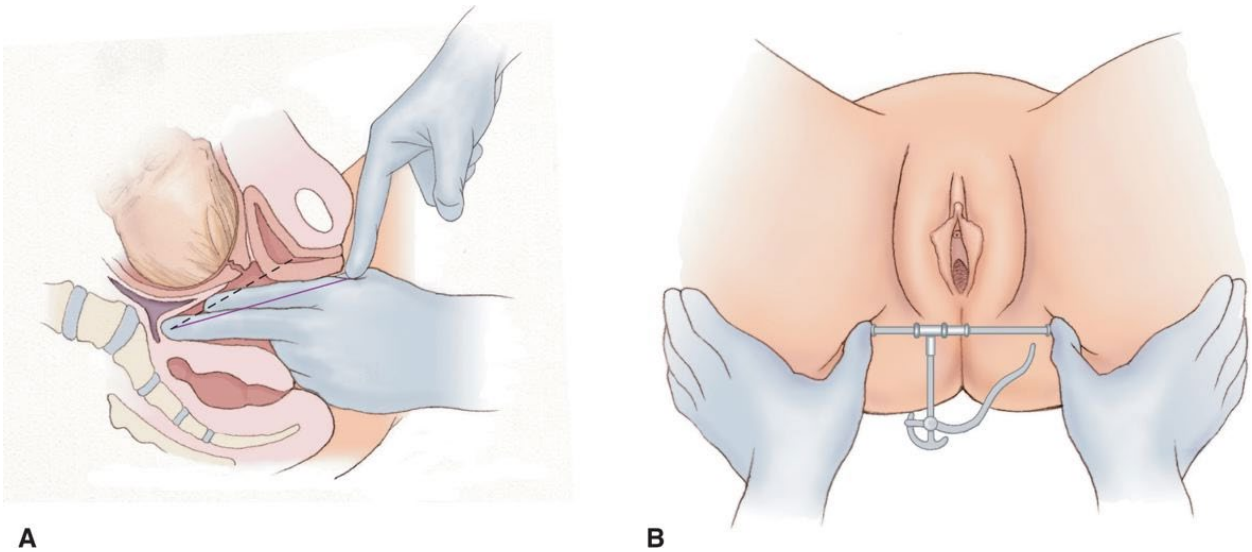


FIGURE 12.4

Pelvic measurements. (**A**) Diagonal conjugate (solid line) and true conjugate (dotted line). (**B**) Ischial tuberosity diameter.

The true conjugate, also called the obstetric conjugate, is the measurement from the anterior surface of the sacral prominence to the posterior surface of the inferior margin of the symphysis pubis. This diameter cannot be measured directly; rather, it is estimated by subtracting 1 to 2 cm from the diagonal conjugate measurement. The average true conjugate diameter is at least 11.5 cm (Cunningham et al., 2010). This measurement is important because it is the smallest front-to-back diameter through which the fetal head must pass when moving through the pelvic inlet.

The ischial tuberosity diameter is the transverse diameter of the pelvic outlet. This measurement is made outside the pelvis at the lowest aspect of the ischial tuberosities. A diameter of 10.5 cm or more is considered adequate for passage of the fetal head (Tharpe, Farley, & Jordan, 2013).

Laboratory Tests

A series of tests is generally ordered during the initial visit so that baseline data can be obtained, allowing for early detection and prompt intervention if any problems occur. Tests that are generally conducted for all pregnant women include urinalysis and blood studies. The urine is analyzed for albumin, glucose, ketones, and bacteria casts. Blood studies usually include a complete blood count (hemoglobin, hematocrit, red and white blood cell counts, and platelets), blood typing and Rh factor, glucose screening for high-risk women, a rubella titer, hepatitis B surface antibody antigen, HIV, VDRL or RPR tests, and cervical smears to detect STIs (**Common Laboratory and Diagnostic Tests 12.1**). In addition, most offices and clinics have ultrasound equipment available to validate an intrauterine pregnancy and assess early fetal growth.

COMMON LABORATORY AND DIAGNOSTIC TESTS 12.1

Test	Explanation
Complete blood cell count (CBC)	Evaluates hemoglobin (12–14 g) and hematocrit (42% ± 5) levels and red blood cell count (4.2–5.4 million/mm^3) to detect presence of anemia; identifies white blood cell level (5,000–10,000/mm^3), which if elevated may indicate an infection; determines platelet count (150,000–450,000 mL^3) to assess clotting ability
Blood typing	Determines woman's blood type and Rh status to rule out any blood incompatibility issues early; Rh-negative mother would likely receive RhoGAM (at 28 week's gestation) and again within 72 hours after childbirth, if she is Rh sensitive
Rubella titer	Detects antibodies for the virus that causes German measles; if titer is 1:8 or less, the woman is not immune;

Test	Explanation
	requires immunization after birth, and woman is advised to avoid people with undiagnosed rashes
Hepatitis B	Determines if mother has hepatitis B by detecting presence of hepatitis antibody surface antigen (HbsAg) in her blood
HIV testing	Detects HIV antibodies and if positive requires more specific testing, counseling, and treatment during pregnancy with antiretroviral medications to prevent transmission to fetus
STI screening: Venereal Disease Research Laboratory (VDRL) or rapid plasma reagin (RPR) serologic tests or by cervical smears, cultures, or visual identification of suspicious lesions	Detects STIs (such as syphilis, herpes, HPV, gonorrhea) so that treatment can be initiated early to prevent transmission to fetus
Cervical smears	Detects abnormalities such as cervical cancer (Pap test) or infections such as gonorrhea, chlamydia, or group B streptococcus so that treatment can be initiated if positive

Adapted from Pagana, K. D., & Pagana, T. J. (2011). *Mosby's manual of diagnostic and laboratory tests* (10th ed.). St. Louis, MO: Mosby Elsevier; and Van Leeuwen, A. M., Poelhuis-Leth, D., & Bladh, M. L. (2011). *Davis's comprehensive handbook of laboratory diagnostic tests with nursing implications* (4th ed.). Philadelphia, PA: F. A. Davis.

The need for additional laboratory studies is determined by a woman's history, physical examination findings, current health status, and risk factors identified in the initial interview. Additional tests can be offered (e.g., screening for genetic diseases, blood lead screening, rubeola, and so on), but ultimately the woman and her partner make the decision about undergoing them. Educate the client and her partner about the tests, including the rationale. In addition, support the client and her partner in their decision-making process, regardless of whether you agree with the couple's decision. The couple's decisions about their health care are based on the ethical principle of autonomy, which **B** allows an individual the right to make decisions about his or her own body.

Remember Linda and Rob, the couple who want to start a family? Ten months after the preconception appointment, Linda calls to make a first prenatal appointment. What key areas will be addressed at this first prenatal visit? What interventions might be suggested for Linda to implement in order to ensure a healthy newborn?

FOLLOW-UP VISITS

Continuous prenatal care is important for a successful pregnancy outcome. The recommended follow-up visit schedule for a healthy pregnant woman is as follows:

- Every 4 weeks up to 28 weeks (7 months)
- Every 2 weeks from 29 to 36 weeks
- Every week from 37 weeks to birth

At each subsequent prenatal visit the following assessments are completed:

- Weight and blood pressure, which are compared to baseline values
- Urine testing for protein, glucose, ketones, and nitrites
- Fundal height measurement to assess fetal growth
- Assessment for quickening/fetal movement to determine fetal well-being
- Assessment of fetal heart rate (should be 110 to 160 bpm)

At each follow-up visit, answer questions, provide anticipatory guidance and education, review nutritional guidelines, and evaluate the client for compliance with prenatal vitamin therapy. Throughout the pregnancy, encourage the woman's partner to participate if possible.

Follow-Up Visit Intervals and Assessments

Up to 28 weeks' gestation, follow-up visits involve assessment of the client's blood pressure and weight. The urine is tested for protein and glucose. Fundal height and fetal heart rate are assessed at every office visit.

Screening for gestational diabetes is best done between 24 and 28 weeks' gestation, unless screening is warranted in the first trimester for high-risk reasons (obesity, >25 years old, family history of diabetes, history of gestational diabetes, or woman is of a certain ethnic group: Hispanic, American Indian, Asian, or African American) (U.S. Preventive Services Task Force [USPSTF], 2010). Between weeks 24 and 28, a blood glucose level is obtained using an oral 50-g glucose load followed by a 1-hour plasma glucose determination. If the result is more than 130 (ADA) to140 (ACOG) mg/dL, further testing, such as a 3-hour 100-g glucose tolerance test, is warranted to determine whether gestational diabetes is present (Kendrick, 2011). Because insulin resistance increases as pregnancy advances, testing at this gestational point yields a higher rate of abnormal test results.

During this time, review the common discomforts of pregnancy, evaluate any client complaints, and answer questions. Reinforce the importance of good nutrition and use of prenatal vitamins, along with daily exercise.

Between 29 and 36 weeks' gestation, all the assessments of previous visits are completed, along with assessment for edema. Special attention is focused on the presence and location of edema during the last trimester. Pregnant women commonly experience dependent edema of the lower extremities from constriction of blood vessels secondary to the heavy gravid uterus. Periorbital edema around the eyes, edema of the hands, and pretibial edema are abnormal and could be signs of gestational hypertension.

Inspecting and palpating both extremities, listening for complaints of tight rings on fingers, and observing for swelling around the eyes are important assessments. Abnormal findings in any of these areas need to be reported.

If the mother is Rh negative, her antibody titer is evaluated. RhoGAM is given if indicated. RhoGAM is used to prevent development of antibodies to Rh^+ red cells whenever fetal cells are known or suspected of entering the maternal circulation such as after a spontaneous abortion or amniocentesis. It is also recommended for prophylaxis at 28 weeks' gestation and following birth if the infant is Rh^+ (King & Brucker, 2011). The client also is evaluated for risk of preterm labor. At each visit, ask if she is experiencing any common signs or symptoms of preterm labor (e.g., uterine contractions, dull backache, feeling of pressure in the pelvic area or thighs, increased vaginal discharge, menstrual-like cramps, vaginal bleeding). A pelvic examination is performed to assess the cervix for position, consistency, length, and dilation. If the woman has had a previous preterm birth, she is at risk for another and close monitoring is warranted.

Counsel the woman about choosing a health care provider for the newborn, if she has not selected one yet. Along with completion of a breast assessment, discuss the choice of breast-feeding versus bottle-feeding. Reinforce the importance of daily fetal movement monitoring as an indicator of fetal well-being. Reevaluate hemoglobin and hematocrit levels to assess for anemia.

Between 37 and 40 weeks' gestation, the same assessments are done as for the previous weeks. In addition, screening for group B streptococcus, gonorrhea, and chlamydia is done. Fetal presentation and position (via Leopold's maneuvers) are assessed. Review the signs and symptoms of labor and forward a copy of the prenatal record to the hospital labor department for future reference. Review the client's desire for family planning after birth as well as her decision to breast-feed or bottle-feed. Remind the client that an infant car seat is required by law and must be used to drive the newborn home from the hospital or birthing center.

Fundal Height Measurement

Fundal height is the distance (in centimeters) measured with a tape measure from the top of the pubic bone to the top of the uterus (fundus) with the client lying on her back with her knees slightly flexed (**Fig. 12.5**). Measurement in this way is termed the McDonald's method. Fundal height typically increases as the pregnancy progresses; it reflects fetal growth and provides a gross estimate of the duration of the pregnancy.

FIGURE 12.5

Fundal height measurement.

Between 12 and 14 weeks' gestation, the fundus can be palpated above the symphysis pubis. The fundus reaches the level of the umbilicus at approximately 20 weeks and measures 20 cm. Fundal measurement should approximately equal the number of weeks of gestation until week 36. For example, a fundal height of 24 cm suggests a fetus at 24 weeks' gestation. After 36 weeks, the fundal height then drops due to lightening and may no longer correspond with the week of gestation.

It is expected that the fundal height will increase progressively throughout the pregnancy, reflecting fetal growth. However, if the growth curve flattens or stays stable, it may indicate the presence of intrauterine growth restriction (IUGR). If the fundal height measurement is greater than 4 cm from the estimated gestational age, further evaluation is warranted if a multifetal gestation has not been diagnosed or hydramnios has not been ruled out (Weber & Kelley, 2010).

Fetal Movement Determination

Fetal movement is usually perceived by the client between 16 and 20 weeks' gestation. Perceived fetal movement is most often related to trunk and limb motion and rollovers, or flips (Kaluzynski, Kret, Czajkowski, Sieńko, & Zmigrodzki, 2011). Maternal perception of fetal movement is an important screening method for fetal well-being, because decreased fetal movement is associated with a range of

pregnancy pathologies and poor pregnancy outcomes. Decreased fetal movement may indicate asphyxia and IUGR. If compromised, the fetus decreases its oxygen requirements by decreasing activity. Reduced fetal movement is thought to represent fetal compensation in a chronic hypoxic environment due to inadequacies in the placental supply of oxygen and nutrients (Warrander & Heazell, 2011). A decrease in fetal movement may also be related to other factors as well, such as maternal use of central nervous system depressants, fetal sleep cycles, hydrocephalus, bilateral renal agenesis, and bilateral hip dislocation (Warrander & Heazell, 2011).

Many variations for determining fetal movement, also called fetal movement counts, have been developed, but the two major methods are described in **Box 12.4**. Fetal movement is a noninvasive method of screening and can be easily taught to all pregnant women. Both techniques require client participation.

BOX 12.4: TECHNIQUES FOR FETAL MOVEMENT COUNTS

Maternal perception of fetal movements or counting of fetal movements is an inexpensive, noninvasive method of assessing fetal well-being. Daily fetal kick counting by the compliant woman is a worthwhile adjunct in determining the need for fetal surveillance tests in the office and in predicting abnormal fetal heart rate patterns and perhaps impending stillbirth. Monitoring has its greatest value when placental insufficiency is long standing. Several different techniques, two of which are described below, can be used. Scientific evidence has not shown that one technique is better than another. Fetal movement counts should be done at approximately the same time each day, and further testing should be initiated within 12 hours of a client's perception of decreased activity (Mangesi & Hofmeyr, 2010).

First Technique

The woman lies or sits and concentrates on fetal movements until she records 10 movements and the time span it took to achieve this number. She is instructed to notify her health care provider if she doesn't feel at least 10 movements within 1 hour. Further follow-up testing is indicated.

Second Technique

The woman lies down on her left side for 1 hour after meals and concentrates on fetal movement. Four movements should be felt within 1 hour. If four movements have not been felt within 1 hour, then the woman should monitor movement for a second hour. If after 2 hours four movements haven't been felt, the client should contact her health care provider.

Instruct the client about how to count fetal movements, the reasons for doing so, and the significance of decreased fetal movements. Urge the client to perform the counts in a relaxed environment and a comfortable position, such as semi-Fowler's or side-lying. Provide the client with detailed information concerning fetal movement counts and stress the need for consistency in monitoring (at approximately the same time each day) and the importance of informing the health care provider promptly of any reduced movements. Providing clients with "fetal kick count" charts to record movement helps promote

compliance. No values for fetal movement have been established that indicate fetal well-being, but instruct the woman to report a count of less than three fetal movements within an hour. In such a situation, further investigation with a nonstress test or biophysical profile is usually warranted (Mangesi & Hofmeyr, 2010).

Fetal Heart Rate Measurement

Fetal heart rate measurement is integral to fetal surveillance throughout the pregnancy. Auscultating the fetal heart rate with a handheld Doppler at each prenatal visit helps confirm that the intrauterine environment is still supportive to the growing fetus. The purpose of assessing fetal heart rate is to determine rate and rhythm. The normal fetal heart rate range is 110 to 160 bpm. **Nursing Procedure 12.1** lists the steps in measuring fetal heart rate.

NURSING PROCEDURE 12.1: Measuring Fetal Heart Rate

Purpose: To assess fetal well-being

- 1. Assist the woman onto the examining table and have her lie down.
- 2. Cover her with a sheet to ensure privacy, and then expose her abdomen.
- 3. Palpate the abdomen to determine the fetal lie, position, and presentation.
- 4. Locate the back of the fetus (the ideal position to hear the heart rate).
- 5. Apply lubricant gel to abdomen in the area where the back has been located.
- 6. Turn on the handheld Doppler device and place it on the spot over the fetal back.
- 7. Listen for the sound of the amplified heart rate, moving the device slightly from side to side as necessary to obtain the loudest sound. Assess the woman's pulse rate and compare it to the amplified sound. If the rates appear the same, reposition the Doppler device.
- 8. Once the fetal heart rate has been identified, count the number of beats in 1 minute and record the results.
- 9. Remove the Doppler device and wipe off any remaining gel from the woman's abdomen and the device.
- 10. Record the heart rate on the woman's medical record; normal range is 110 to 160 bpm.
- 11. Provide information to the woman regarding fetal well-being based on findings.

Teaching About the Danger Signs of Pregnancy

It is important to educate the client about danger signs during pregnancy that require further evaluation. Explain that she should contact her health care provider immediately if she experiences any of the following:

- *During the first trimester:* spotting or bleeding (miscarriage), painful urination (infection), severe persistent vomiting (hyperemesis gravidarum), fever >100° F (37.7° C; infection), and lower abdominal pain with dizziness and accompanied by shoulder pain (ruptured ectopic pregnancy)

- *During the second trimester:* regular uterine contractions (preterm labor); pain in calf, often increased with foot flexion (blood clot in deep vein); sudden gush or leakage of fluid from vagina (premature rupture of membranes); and absence of fetal movement for more than 12 hours (possible fetal distress or demise)
- *During the third trimester:* sudden weight gain; periorbital or facial edema, severe upper abdominal pain, or headache with visual changes (pregnancy-induced hypertension); and a decrease in fetal daily movement for more than 24 hours (possible demise). Any of the previous warning signs and symptoms can also be present in this last trimester (March of Dimes, 2011c).

One of the warning signs that should be emphasized is early contractions, which can lead to preterm birth. The woman should not confuse these early preterm contractions with Braxton Hicks contractions, which are not true labor pains because they go away when walking around or resting. They often go away when the woman goes to sleep. Braxton Hicks contractions are usually felt in the abdomen versus in the lower back with true preterm labor contractions.

All pregnant women need to be able to recognize early signs of contractions to prevent preterm labor, which is a major public health problem in the United States. Approximately 12% of all live births—or one out of eight babies—is born too soon (March of Dimes, 2011d). These preterm infants (born at less than 38 weeks' gestation) can suffer lifelong health consequences such as intellectual disability, chronic lung disease, cerebral palsy, seizure disorders, and blindness (March of Dimes, 2011d). Preterm labor can happen to any pregnant women at any time. In many cases it can be stopped with medications if it is recognized early, before significant cervical dilation has taken place. If the woman experiences menstrual-like cramps occurring every 10 minutes accompanied by a low, dull backache, she should stop what she is doing and lie down on her left side for 1 hour and drink two or three glasses of water. If the symptoms worsen or do not subside after 1 hour, she should contact her health care provider.

ASSESSMENT OF FETAL WELL-BEING

During the antepartum period, several tests are performed routinely to monitor fetal well-being and to detect possible problems. When a high-risk pregnancy is identified, additional antepartum testing can be initiated to promote positive maternal, fetal, and neonatal outcomes. **High-risk pregnancies** include those that are complicated by maternal or fetal conditions (coincidental with or unique to pregnancy) that jeopardize the health status of the mother and put the fetus at risk for uteroplacental insufficiency, hypoxia, and death (Gilbert, 2011). However, additional antepartum fetal testing should take place only when the results obtained will guide future care, whether it is reassurance, more frequent testing, admission to the hospital, or the need for immediate delivery (Gilbert, 2011).

Ultrasonography

Since its introduction in the late 1950s, ultrasonography has become a very useful diagnostic tool in obstetrics. Real-time scanners can produce a continuous picture of the fetus on a monitor screen. A transducer that emits high-frequency sound waves is placed on the mother's abdomen and moved to visualize the fetus (**Fig. 12.6**). The fetal heartbeat and

any malformations in the fetus can be assessed and measurements can be made accurately from the picture on the monitor screen.

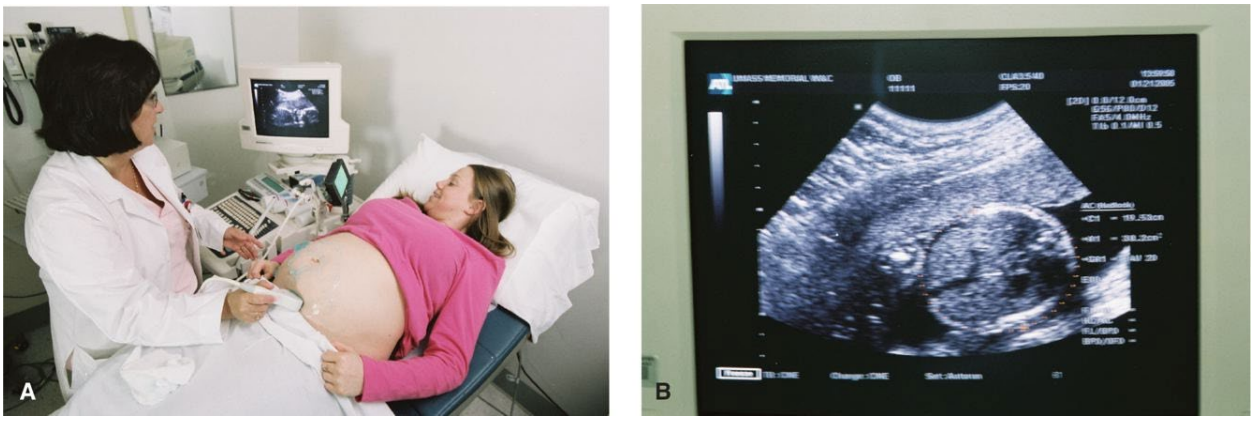


FIGURE 12.6

Ultrasound. (**A**) Ultrasound device being applied to client's abdomen. (**B**) View of monitor.

Because the ultrasound procedure is noninvasive, it is a safe, accurate, and cost-effective tool. It provides important information about fetal activity, growth, and gestational age; assesses fetal well-being; and determines the need for invasive intrauterine tests (Kooshesh & Gharahbaghian, 2011).

There are no hard-and-fast rules as to the number of ultrasounds a woman should have during her pregnancy. A transvaginal ultrasound may be performed in the first trimester to confirm pregnancy, exclude ectopic or molar pregnancies, and confirm cardiac pulsation. A second abdominal scan may be performed at about 18 to 20 weeks to look for congenital malformations, exclude multifetal pregnancies, and verify dates and growth. A third abdominal scan may be done at around 34 weeks to evaluate fetal size, assess fetal growth, and verify placental position (Kooshesh & Gharahbaghian, 2011). An ultrasound is used to confirm placental location during amniocentesis and to provide visualization during chorionic villus sampling. An ultrasound is also ordered whenever an abnormality is suspected.

During the past several years, ultrasound technology has advanced significantly. Now available for expecting parents is 3D/4D ultrasound imaging. Unlike traditional 2D imaging, which takes a look at the developing fetus from one angle (thus creating the "flat" image), 3D imaging takes a view of the fetus from three different angles. Software then takes these three images and merges them to produce a three-dimensional image. Because the fourth dimension is time and movement, with 4D parents are able to watch the live movements of their fetus in 3D.

It is sometimes argued by health care providers that 3D/4D ultrasound sessions are not necessary and therefore should not be done. Although 3D/4D sessions are not necessary for diagnostic reasons, many parents request them and pay handsomely for them. Some suggest that seeing a realistic view into the uterus makes the pregnancy much more real and often causes mothers to take better care of themselves. Regardless of the reasons or controversies behind this technology, parents still want to "see" the unknown.

Nursing management during the ultrasound procedure focuses on educating the woman about the ultrasound test and reassuring her that she will not experience any sensation from the sound waves during the test. No special client preparation is needed before performing the ultrasound, although in early pregnancy the woman may need to have a full bladder. Inform her that she may experience some discomfort from the pressure on the full bladder during the scan, but it will last only a short time. Tell the client that the conducting gel used on the abdomen during the scan may feel cold initially.

Doppler Flow Studies

Doppler flow studies can be used to measure the velocity of blood flow via ultrasound. Doppler flow studies can detect fetal compromise in high-risk pregnancies. The test is noninvasive and has no contraindications. The color images produced help to identify abnormalities in diastolic flow within the umbilical vessels. The velocity of the fetal red blood cells can be determined by measuring the change in the frequency of the sound wave reflected off the cells. Thus, Doppler flow studies can detect the movement of red blood cells in vessels (Gilbert, 2011). In pregnancies complicated by hypertension or IUGR, diastolic blood flow may be absent or even reversed (Gilbert, 2011). Doppler flow studies also can be used to evaluate the blood flow through other fetal blood vessels, such as the aorta and those in the brain. Research continues to determine the indications for Doppler flow studies to improve pregnancy outcomes. Nursing management of the woman undergoing Doppler flow studies is similar to that described for an ultrasound.

Alpha-Fetoprotein Analysis

Alpha-fetoprotein (AFP) is a glycoprotein produced initially by the yolk sac and fetal gut, and later predominantly by the fetal liver. In a fetus, the serum AFP level increases until approximately 14 to 15 weeks, and then falls progressively. In normal pregnancies, AFP from fetal serum enters the amniotic fluid (in microgram quantities) through fetal urination, fetal gastrointestinal secretions, and transudation across fetal membranes (amnion and placenta). About 30 years ago, elevated levels of maternal serum AFP or amniotic fluid AFP were first linked to the occurrence of fetal neural tube defects. This biomarker screening test is now recommended for all pregnant women (Alexander, LaRosa, Bader, & Garfield, 2010; ACOG, 2010; USPSTF, 2010).

AFP is present in amniotic fluid in low concentrations between 10 and 14 weeks of gestation and can be detected in maternal serum beginning at approximately 12 to 14 weeks of gestation (Gilbert, 2011). If a developmental defect is present, such as failure of the neural tube to close, more AFP escapes into amniotic fluid from the fetus. AFP then enters the maternal circulation by crossing the placenta, and the level in maternal serum can be measured. The optimal time for AFP screening is 16 to 18 weeks of gestation (ACOG, 2010a). Correct information about gestational dating, maternal weight, race, number of fetuses, and insulin dependency is necessary to ensure the accuracy of this screening test. If incorrect maternal information is submitted or the blood specimen is not drawn during the appropriate time frame, false-positive results may occur,

increasing the woman's anxiety. Subsequently, further testing might be ordered based on an inaccurate interpretation, resulting in additional financial and emotional costs to the woman.

A variety of situations can lead to elevation of maternal serum AFP, including open neural tube defect, underestimation of gestational age, the presence of multiple fetuses, gastrointestinal defects, low birth weight, oligohydramnios, and decreased maternal weight (Bredaki, Wright, Matos, Syngelaki, & Nicolaides, 2011). Lower-than-expected maternal serum AFP levels are seen when fetal gestational age is overestimated or in cases of fetal death, hydatidiform mole, increased maternal weight, maternal type 1 diabetes, and fetal trisomy 21 (Down syndrome) or trisomy 18 (Edward's syndrome) (Gilbert, 2011).

Measurement of maternal serum AFP is minimally invasive, requiring only a venipuncture for a blood sample. It detects approximately 80% of all open neural tube defects and open abdominal wall defects in early pregnancy (Bredaki et al., 2011). AFP has now been combined with other biomarker screening tests to determine the risk of neural tube defects and Down syndrome.

Nursing management for AFP testing consists of preparing the woman for this screening test by gathering accurate information about the date of her LMP, weight, race, and gestational dating. Accurately determining the window of 16 to 18 weeks' gestation will help to ensure that the test results are correct. Also explain that the test involves obtaining a blood specimen.

Marker Screening Tests

Prenatal screening for Down syndrome in the early second trimester with multiple maternal serum markers has been available for more than 15 years. Multiple blood screening tests may be used to determine the risk of open neural tube defects and Down syndrome: the triple-marker screen (AFP, hCG, and unconjugated estriol) or the quad screen, which includes the triple screening tests with the addition of a fourth marker, inhibin A (glycoprotein secreted by the placenta). The quad screen is used to enhance the accuracy of screening for Down syndrome in women younger than 35 years of age. Low inhibin A levels indicate the possibility of Down syndrome (Van Leeuwen, Poelhuis-Leth, & Bladh, 2011). These biomarkers are merely screening tests and identify women who need further definitive procedures (i.e., ultrasound, amniocentesis and genetic counseling) to make a diagnosis of neural tube defects (anencephaly, spina bifida, and encephalocele) or Down syndrome in the fetus. Most screening tests are performed between 15 to 22 weeks of gestation (16 to 18 weeks is ideal) (Dugoff et al., 2011).

With these multiple screening tests, low maternal serum AFP (MSAFP), unconjugated estriol levels, and a high hCG level suggest the possibility of Down syndrome. Elevated levels of MSAFP are associated with open neural tube defects, ventral wall defects, some renal abnormalities, multiple gestation, certain skin disorders, fetal demise, and placental abnormality. The multiple marker combination with the highest screening performance currently available is AFP, unconjugated estriol (uE3), hCG, and inhibin A, together with maternal age (the so-called quad marker test). With this combination, a detection rate of 80% at a 5% false positive rate is achieved (Canick & MacRae, 2011).

A number of factors influence the interpretation of an MSAFP value. The most important is the accuracy of the gestational age determination. A variation of 2 weeks can be misleading and lead

to a wrong interpretation. Maternal weight (>250 pounds), ethnicity, maternal smoking habits, fetal gender, gravidity, para status, and women with insulin-dependent diabetes also may alter the levels of MSAFP and need to be taken into consideration when interpreting the results (de Graaf et al., 2011).

Nursing management related to marker screening tests consists primarily of providing education about the tests. Prenatal screening has become standard in prenatal care. However, for many couples it remains confusing, emotionally charged, and filled with uncertain risks. Offer a thorough explanation of the test, reinforcing the information given by the health care professional. Provide couples with a description of the risks and benefits of performing these screens, emphasizing that these tests are for screening purposes only. Remind the couple that a definitive diagnosis is not made without further tests such as an amniocentesis. Answer any questions about these prenatal screening tests and respect the couple's decision if they choose not to have them done. Many couples may choose not to know because they would not consider having an abortion regardless of the test results.

Nuchal Translucency Screening

Nuchal translucency screening (ultrasound) is also done in the first trimester between 11 and 14 weeks. This allows for early detection and diagnosis of some fetal chromosomal and structural abnormalities. Ultrasound is used to identify an increase in nuchal translucency, which is due to the subcutaneous accumulation of fluid behind the fetal neck. Increased nuchal translucency is associated with chromosomal abnormalities such as trisomy 21, 18, and 13. Infants with trisomies tend to have more collagen and elastic connective tissue, allowing for accumulation. In addition, diaphragmatic hernias, cardiac defects, and fetal skeletal and neurologic abnormalities have been associated with increased nuchal translucency measurements (Cuckle, 2010).

Amniocentesis

Amniocentesis involves a transabdominal puncture of the amniotic sac to obtain a sample of amniotic fluid for analysis. The fluid contains fetal cells that are examined to detect chromosomal abnormalities and several hereditary metabolic defects in the fetus before birth. In addition, amniocentesis is used to confirm a fetal abnormality when other screening tests detect a possible problem.

Amniocentesis is performed in the second trimester, usually between 15 and 18 weeks' gestation. At this age, the amount of fluid is adequate (approximately 150 mL), and the ratio of viable to nonviable cells is greatest (Collins, & Impey, 2012). More than 40 different chromosomal abnormalities, inborn errors of metabolism, and neural tube defects can be diagnosed with amniocentesis. It can replace a genetic probability with a diagnostic certainty, allowing the woman and her partner to make an informed decision about the option of therapeutic abortion.

Amniocentesis can be performed in any of the three trimesters of pregnancy. An early amniocentesis (performed between weeks 11 and 14) is done to detect genetic anomalies. However, early amniocentesis has been associated with a high risk of spontaneous miscarriage

and postprocedural amniotic fluid leakage compared with transabdominal chorionic villus screening (Singh & Singh, 2011). ACOG (2011f) recommends chorionic villus sampling and nuchal translucency to detect Down syndrome rather than amniocentesis because of the increased risks associated with the early procedure. However, early screening and diagnosis can provide the couple with time to make decisions about the pregnancy outcome.

In the second trimester the procedure is performed between 15 and 20 weeks to detect chromosomal abnormalities, evaluate the fetal condition when the woman is sensitized to the Rh-positive blood, diagnose intrauterine infections, and investigate amniotic fluid AFP when the MSAFP level is elevated (Gilbert, 2011).

In the third trimester amniocentesis is most commonly indicated to determine fetal lung maturity after the 35th week of gestation via analysis of lecithin-to-sphingomyelin ratios and to evaluate the fetal condition with Rh isoimmunization. **Table 12.2** lists amniotic fluid analysis findings and their implications.

TABLE 12.2: AMNIOTIC FLUID ANALYSIS AND IMPLICATIONS

Test Component	Normal Findings	Fetal Implications of Abnormal Findings
Color	Clear with white flecks of vernix caseosa in a mature fetus	Blood of maternal origin is usually harmless. "Port wine" fluid may indicate abruptio placentae. Fetal blood may indicate damage to the fetal, placental, or umbilical cord vessels.
Bilirubin	Absent at term	High levels indicate hemolytic disease of the neonate in isoimmunized pregnancy.
Meconium	Absent (except in breech presentation)	Presence indicates fetal hypotension or distress.
Creatinine	More than 2 mg/dL in a mature fetus	Decrease may indicate immature fetus (less than 37 wks).
Lecithin-to-sphingomyelin ratio (L/S ratio)	More than 2 generally indicates fetal pulmonary maturity.	A ratio of less than 2 indicates pulmonary immaturity and

Test Component	Normal Findings	Fetal Implications of Abnormal Findings
		subsequent respiratory distress syndrome.
Phosphatidylglycerol	Present	Absence indicates pulmonary immaturity.
Glucose	Less than 45 mg/dL	Excessive increases at term or near term indicate hypertrophied fetal pancreas and subsequent neonatal hypoglycemia.
Alpha-fetoprotein	Variable, depending on gestation age and laboratory technique; highest concentration (about 18.5 ng/mL) occurs at 13–14 wks	Inappropriate increases indicate neural tube defects such as spina bifida or anencephaly, impending fetal death, congenital nephrosis, or contamination of fetal blood.
Bacteria	Absent	Presence indicates chorioamnionitis.
Chromosomes	Normal karyotype	Abnormal karyotype may indicate fetal sex and chromosome disorders.
Acetylcholinesterase	Absent	Presence may indicate neural tube defects, exomphalos, or other serious malformations.

Adapted from Cunningham, F., Leveno, K. Bloom, S., Hauth, J., Rouse, D., & Spong, K. (2010). *William's obstetrics* (23rd ed.). New York: McGraw-Hill; March of Dimes. (2011a). *Amniocentesis*. Retrieved from **http://www.marchofdimes.com/pregnancy/prenatalcare_amniocentesis.html** and Springer, S. C. (2011). Prenatal diagnosis and fetal therapy. *eMedicine*. Retrieved from **http://emedicine.medscape.com/article/936318-overview#aw2aab6b5**.

The second trimester is the most common time to have an amniocentesis for any prenatal diagnosis because it carries a very high risk if done earlier. By week 14 to 16 of gestation, sufficient amniotic fluid is present for sampling, yet enough time remains for a safe abortion, if desired. Amniocentesis is offered to women who are 35 years of age or older, women who have a child with a neural tube defect, and women with elevated MSAFP levels.

It also may be used to detect chromosomal aberrations when a parent has a chromosomal abnormality or is a carrier for a metabolic disease (Cunningham et al., 2010).

Procedure

Amniocentesis is performed after an ultrasound examination identifies an adequate pocket of amniotic fluid free of fetal parts, the umbilical cord, or the placenta (**Fig. 12.7**). The health care provider inserts a long pudendal or spinal needle, a 22-gauge, 5-inch needle, into the amniotic cavity and aspirates amniotic fluid, which is placed in an amber or foil-covered test tube to protect it from light. When the desired amount of fluid has been withdrawn, the needle is removed and slight pressure is applied to the site. If there is no evidence of bleeding, a sterile bandage is applied to the needle site. The specimens are then sent to the laboratory immediately for the cytologist to evaluate.

FIGURE 12.7

Technique for amniocentesis: Inserting needle.

Examining a sample of fetal cells directly produces a definitive diagnosis rather than a "best guess" diagnosis based on indirect screening tests. It is an invaluable diagnostic tool, but the risks include lower abdominal discomfort and cramping that may last up to 48 hours after the procedure, spontaneous abortion (1 in 200), maternal or fetal infection, postamniocentesis chorioamnionitis that has an insidious onset, fetal–maternal hemorrhage, leakage of amniotic

fluid in 2% to 3% of women after the procedure, and higher rates of fetal loss in earlier amniocentesis procedures (<15 weeks gestation) versus later ones (Tabor & Alfirevic, 2010). The test results may take up to 3 weeks.

Nursing Management

When preparing the woman for an amniocentesis, explain the procedure and its potential complications, and encourage her to empty her bladder just before the procedure to avoid the risk of bladder puncture. Inform her that a 20-minute electronic fetal monitoring strip usually is obtained to evaluate fetal well-being and obtain a baseline to compare after the procedure is completed. Obtain and record maternal vital signs.

After the procedure, assist the woman to a position of comfort and administer RhoGAM intramuscularly if the woman is Rh negative to prevent potential sensitization to fetal blood. Assess maternal vital signs and fetal heart rate every 15 minutes for an hour after the procedure. Observe the puncture site for bleeding or drainage. Instruct the client to rest after returning home and remind her to report fever, leaking amniotic fluid, vaginal bleeding, or uterine contractions or any changes in fetal activity (increased or decreased) to the health care provider.

When the test results come back, be available to offer support, especially if a fetal abnormality is found. Also prepare the woman and her partner for the need for genetic counseling. Trained genetic counselors can provide accurate medical information and help couples to interpret the results of the amniocentesis so they can make the decisions that are right for them as a family.

Chorionic Villus Sampling

Chorionic villus sampling (CVS) is a procedure for obtaining a sample of the chorionic villi for prenatal evaluation of chromosomal disorders, enzyme deficiencies, and fetal gender determination and to identify sex-linked disorders such as hemophilia, sickle cell anemia, and Tay-Sachs disease (Blumenfeld & Chueh, 2010). Chorionic villi are finger-like projections that cover the embryo and anchor it to the uterine lining before the placenta is developed. Because they are of embryonic origin, sampling provides information about the developing fetus. CVS can be used to detect numerous genetic disorders, with the exception of neural tube defects (Springer, 2011).

There has been an impetus to develop earlier prenatal diagnostic procedures so that couples can make an early decision to terminate the pregnancy if an anomaly is confirmed. Early prenatal diagnosis by CVS has been proposed as an alternative to routine amniocentesis, which carries fewer risks if done later in the pregnancy. In addition, results of CVS testing are available sooner than those of amniocentesis, usually within 48 hours.

Procedure

CVS is generally performed 10 to 13 weeks after the LMP. Earlier, chorionic villi may not be sufficiently developed for adequate tissue sampling and the risk of limb defects is increased

(Verklan & Walden, 2010). First, an ultrasound is done to confirm gestational age and viability. Then, under continuous ultrasound guidance, CVS is performed using either a transcervical or transabdominal approach. With the transcervical approach, the woman is placed in the lithotomy position and a sterile catheter is introduced through the cervix and inserted in the placenta, where a sample of chorionic villi is aspirated. This approach requires the client to have a full bladder to push the uterus and placenta into a position that is more accessible to the catheter. A full bladder also helps in better visualization of the structures. With the transabdominal approach, an 18-gauge spinal needle is inserted through the abdominal wall into the placental tissue and a sample of chorionic villi is aspirated. Regardless of the approach used, the sample is sent to the cytogenetics laboratory for analysis.

Potential complications of CVS include postprocedure vaginal bleeding and cramping (most common), hematomas, spontaneous abortion, limb abnormalities, rupture of membranes, infection, chorioamnionitis, and fetal–maternal hemorrhage (Tabor & Alfirevic, 2010). The pregnancy loss rate or procedure-related miscarriage rate is approximately 0.5% to 1.0%, which is the same rate for amniocentesis (Tabor & Alfirevic, 2010). In addition, women who are Rh negative should receive immune globulin (RhoGAM) to avoid isoimmunization (Gilbert, 2011).

Nursing Management

Explain to the woman that the procedure will last about 15 minutes. An ultrasound will be done first to locate the embryo, and a baseline set of vital signs will be taken before starting. Make sure she is informed of the risks related to the procedure, including their incidence.

If a transabdominal CVS procedure is planned, advise her to fill her bladder by drinking increased amounts of water. Inform her that a needle will be inserted through her abdominal wall and samples will be collected. Once the samples are collected, the needle will be withdrawn and the samples will be sent to the genetics laboratory for evaluation.

For transcervical CVS, inform the women that a speculum will be placed into the vagina under ultrasound guidance. Then the vagina is cleaned and a small catheter is inserted through the cervix. The samples obtained through the catheter are then sent to a laboratory.

After either procedure, assist the woman to a position of comfort and clean any excess lubricant or secretions from the area. Instruct her about signs to watch for and report, such as fever, cramping, and vaginal bleeding. Urge her not to engage in any strenuous activity for the next 48 hours. Assess the fetal heart rate for changes and administer RhoGAM to an unsensitized Rh-negative woman after the procedure.

Percutaneous Umbilical Blood Sampling

Percutaneous umbilical blood sampling (PUBS) or cordocentesis permits the collection of a blood specimen directly from the fetal circulation via the fetal umbilical vein (**Fig. 12.8**). This test allows for rapid chromosomal analysis to achieve a timely diagnosis. It is done specifically for women at risk for genetic anomalies and those with potential blood disorders, such as blood incompatibility or hemoglobinopathies.

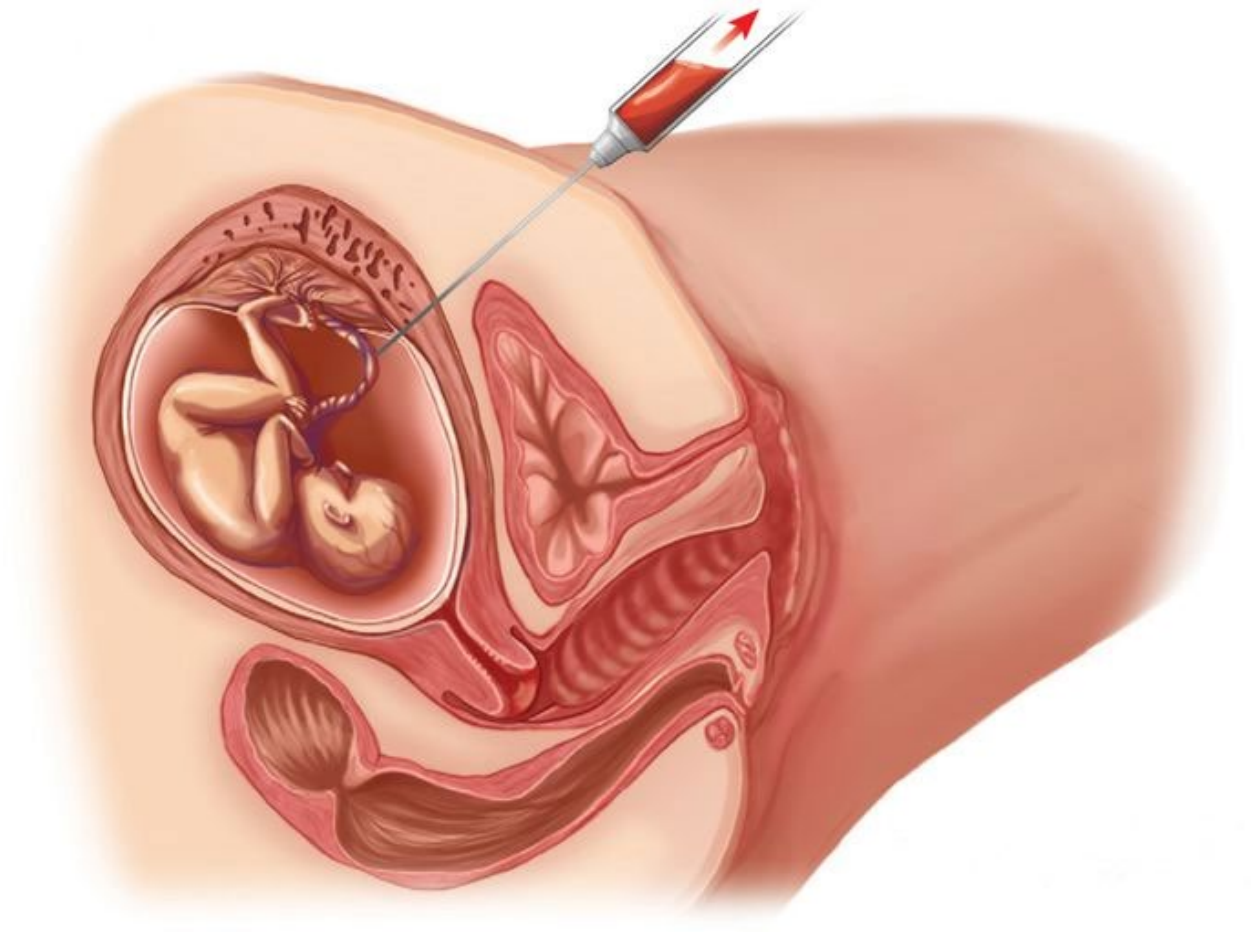


FIGURE 12.8

Collecting blood sample for PUBS.

Procedure

Under continuous ultrasound guidance, a fine needle is inserted through the mother's abdomen and uterine wall into an umbilical cord vessel. Specimens can be evaluated for coagulation studies, blood group typing, complete blood count, karyotyping, and blood gas analysis (Singh & Singh, 2011). Fetal infection, Rh incompatibility, and fetal acid–base status can be determined. The blood sample is usually drawn late in the second trimester to assist in medical management, but PUBS can be done any time after 16 weeks of gestation.

Although the information gained from this procedure is valuable and can be lifesaving for many fetuses, PUBS is not without risks. Potential complications include leakage of blood from the puncture site, cord laceration, cord hematomas, transient fetal bradycardia, infection, thromboembolism in the umbilical cord, fetal bleeding, preterm labor, infection, and premature rupture of membranes (Cunningham et al., 2010).

Nursing Management

Explain the procedure and potential risks thoroughly to the woman. Position her properly on the examination table and help clean the area for needle insertion. Monitor vital signs and fetal heart rate throughout the procedure. At the conclusion of the procedure, closely monitor the mother and fetus for changes. Assess fetal heart rate continuously and perform external fetal monitoring for up to 2 hours before the woman is discharged from the outpatient area. A repeat ultrasound is usually done within an hour after the procedure to rule out bleeding or hematoma formation.

Prior to discharge, instruct the woman to report signs of infection, an increase in contractions, or a change in fetal activity level from normal. Reinforce the need to count fetal movements, and review the technique so she can assess them when she is discharged home.

Nonstress Test

The nonstress test (NST) is an indirect measurement of uteroplacental function. Unlike the fetal movement counting done by the mother alone, this procedure requires specialized equipment and trained personnel. The basis for the nonstress test is that the normal fetus produces characteristic fetal heart rate patterns in response to fetal movements. In the healthy fetus there is an acceleration of the fetal heart rate with fetal movement. Currently, an NST is recommended twice weekly (after 28 weeks of gestation) for clients with diabetes and other high-risk conditions, such as IUGR, preeclampsia, post-term pregnancy, renal disease, and multifetal pregnancies (Cunningham et al., 2010).

NST is a noninvasive test that requires no initiation of contractions. It is quick to perform and there are no known side effects. However, it is not as sensitive to fetal oxygen reserves as the contraction stress test (discussed later), and there is a high false-positive rate (Gilbert, 2011).

Procedure

Before the procedure the client eats a meal to stimulate fetal activity. Then she is placed in the left lateral recumbent position to avoid supine hypotension syndrome. An external electronic fetal monitoring device is applied to her abdomen. The device consists of two belts, each with a sensor. One of the sensors records uterine activity; the second sensor records fetal heart rate. The client is handed an "event marker" with a button that she pushes every time she perceives fetal movement. When the button is pushed, the fetal monitor strip is marked to identify that fetal movement has occurred. The procedure usually lasts 20 to 30 minutes.

Nursing Management

Prior to the NST, explain the testing procedure and have the woman empty her bladder. Position her in a semi-Fowler's position and apply the two external monitor belts. Document the date and time the test is started, client information, the reason for the test, and the maternal vital signs. Obtain a baseline fetal monitor strip over 15 to 30 minutes.

During the test, observe for signs of fetal activity with a concurrent acceleration of the fetal heart rate. Interpret the NST as reactive or nonreactive. A "reactive" NST includes at least two fetal heart rate accelerations from the baseline of at least 15 bpm for at least 15 seconds within the 20-minute recording period. If the test does not meet these criteria after 40 minutes, it is considered nonreactive. A "nonreactive" NST is characterized by the absence of two fetal heart rate accelerations using the 15-by-15 criterion in a 20-minute time frame. A nonreactive test has been correlated with a higher incidence of fetal distress during labor, fetal mortality, and IUGR. Additional testing, such as a biophysical profile, should be considered (Skornick-Rapaport, Maslovitz, Kupferminc, Lessing, & Many, 2011).

After the NST procedure, assist the woman off the table, provide her with fluids, and allow her to use the restroom. Typically the health care provider discusses the results with the woman at this time. Provide teaching about signs and symptoms to report. If serial NSTs are being done, schedule the next testing session.

Contraction Stress Test

Because blood flow to the uterus and placenta is slowed during uterine contractions, the contraction stress test (CST), formerly called the oxytocin-challenge test, is a diagnostic procedure performed to determine the fetal heart rate response under stress, such as during contractions. The focus of the test is to achieve three uterine contractions in a 10-minute period without any fetal heart decelerations occurring. Late fetal heart decelerations occurring with contractions have been associated with an increased rate of fetal death, lower Apgar scores, fetal growth restriction, and the need for neonatal resuscitation secondary to neonatal depression (Mattson & Smith, 2011). This can occur spontaneously with the aid of nipple stimulation, which causes the release of endogenous oxytocin, or through the use of an oxytocin infusion. Its use has been indicated in pregnancies in which placental insufficiency is suspected—preeclampsia, IUGR, diabetes mellitus, post-term pregnancy, a previous still-birth—or when an irregularity of the fetal heart rate has been observed. However, the CST has given way to the biophysical profile and has limited use today because of complications, which include hyperstimulation of contractions and fetal bradycardia (Oyelese & Vintzileos, 2011).

Biophysical Profile

A **biophysical profile (BPP)** uses a real-time ultrasound to allow assessment of various parameters of fetal well-being. A BPP includes ultrasound monitoring of fetal movements, fetal tone, and fetal breathing and ultrasound assessment of amniotic fluid volume with or without assessment of the fetal heart rate. A BPP is performed in an effort to identify infants who may be at risk of poor pregnancy outcome, so that additional assessments of well-being may be performed, or labor may be induced or a caesarean section performed to expedite birth. The primary objectives of the BPP are to reduce stillbirth and to detect hypoxia early enough to allow delivery in time to avoid permanent fetal damage resulting from fetal asphyxia. These parameters, together with the NST, constitute the biophysical profile. Each parameter is controlled by a different structure in the fetal brain: fetal tone by the cortex; fetal movements by the cortex and motor nuclei; fetal breathing movements by the centers close to the

fourth ventricle; and the NST by the posterior hypothalamus and medulla. The amniotic fluid is the result of fetal urine volume. Some facilities do not perform an NST unless other parameters of the profile are abnormal (Gilbert, 2011). The biophysical profile is based on the concept that a fetus that experiences hypoxia loses certain behavioral parameters in the reverse order in which they were acquired during fetal development (normal order of development: tone at 8 weeks; movement at 9 weeks; breathing at 20 weeks; and fetal heart rate reactivity at 24 weeks).

Scoring and Interpretation

The biophysical profile is a scored test with five components, each worth 2 points if present. A total score of 10 is possible if the NST is used. Thirty minutes are allotted for testing, although less than 10 minutes is usually needed. The following criteria must be met to obtain a score of 2; anything less is scored as 0 (Gilbert, 2011):

- *Body movements:* three or more discrete limb or trunk movements
- *Fetal tone:* one or more instances of full extension and flexion of a limb or trunk
- *Fetal breathing:* one or more fetal breathing movements of more than 30 seconds
- *Amniotic fluid volume:* one or more pockets of fluid measuring 2 cm
- *NST:* normal NST = 2 points; abnormal NST = 0 points

Interpretation of the biophysical profile score can be complicated, depending on several fetal and maternal variables. Because it is indicated as a result of a nonreassuring finding from previous fetal surveillance tests, this test can be used to quantify the interpretation, and intervention can be initiated if appropriate. A maximum score of 10 can be achieved and the test is complete once all of the variables have been observed. For the test to be judged abnormal and a score of zero awarded for the absence of fetal movement, fetal tone, or fetal breathing movements, a period of not less than 30 minutes must have elapsed. Because of the excellent sensitivity of fetal NST for fetal acidemia, it has been proposed that this acute marker alone may be used for fetal assessment in combination with the amniotic fluid volume assessment, a chronic marker. This combination, also known as the modified BPP, has been shown to have excellent false-negative rates that compare with that of the complete BPP (Oyelese & Vintzileos, 2011).

One of the important factors is the amniotic fluid volume, taken in conjunction with the results of the NST. Amniotic fluid is largely composed of fetal urine. As placental function decreases, perfusion of fetal organs, such as kidneys, decreases, and this can lead to a reduction of amniotic fluid. If oligohydramnios or decreased amniotic fluid is present, the potential exists for antepartum or intrapartum fetal compromise (Gearhart & Sehdev, 2011).

Overall, a score of 8 to 10 is considered normal if the amniotic fluid volume is adequate. A score of 6 or below is suspicious, possibly indicating a compromised fetus; further investigation of fetal well-being is needed.

Because the biophysical profile is an ultrasonographic assessment of fetal behavior, it requires more extensive equipment and more highly trained personnel than other testing modalities. The cost is much greater than with less sophisticated tests. It permits conservative therapy and prevents premature or

unnecessary intervention. There are fewer false-positive results than with the NST alone or CST (Oyelese & Vintzileos, 2011).

Nursing Management

Nursing management focuses primarily on offering the client support and answering her questions. Expect to complete the NST before scheduling the biophysical profile, and explain why further testing might be needed. Tell the woman that the ultrasound will be done in the diagnostic imaging department.

NURSING MANAGEMENT FOR THE COMMON DISCOMFORTS OF PREGNANCY

Most women experience common discomforts during pregnancy and ask a nurse's advice about ways to minimize them. However, other women will not bring up their concerns unless asked. Therefore, the nurse needs to address the common discomforts that occur in each trimester at each prenatal visit and provide realistic measures to help the client deal with them (**Teaching Guidelines 12.1**). **Nursing Care Plan 12.1** applies the nursing process to the care of a woman experiencing some discomforts of pregnancy.

Teaching Guidelines 12.1: TEACHING TO MANAGE THE DISCOMFORTS OF PREGNANCY

Urinary Frequency or Incontinence

- Try Kegel exercises to increase control over leakage.
- Empty your bladder when you first feel a full sensation.
- Avoid caffeinated drinks, which stimulate voiding.
- Reduce your fluid intake after dinner to reduce night-time urination.

Fatigue

- Attempt to get a full night's sleep, without interruptions.
- Eat a healthy balanced diet.
- Schedule a nap in the early afternoon daily.
- When you are feeling tired, rest.

Nausea and Vomiting

- Avoid an empty stomach at all times.

- Munch on dry crackers/toast in bed before arising.
- Eat several small meals throughout the day.
- Drink fluids between meals rather than with meals.
- Avoid greasy, fried foods or ones with a strong odor, such as cabbage or Brussels sprouts.

Backache

- Avoid standing or sitting in one position for long periods.
- Apply heating pad (low setting) to the small of your back.
- Support your lower back with pillows when sitting.
- Stand with your shoulders back to maintain correct posture.

Leg Cramps

- Elevate legs above heart level frequently throughout the day.
- If you get a cramp, straighten both legs and flex your feet toward your body.
- Ask your health care provider about taking additional calcium supplements, which may reduce leg spasms.

Varicosities

- Walk daily to improve circulation to extremities.
- Elevate both legs above heart level while resting.
- Avoid standing in one position for long periods of time.
- Don't wear constrictive stockings and socks.
- Don't cross the legs when sitting for long periods.
- Wear support stockings to promote better circulation.

Hemorrhoids

- Establish a regular time for daily bowel elimination.
- Prevent straining by drinking plenty of fluids and eating fiber-rich foods and exercising daily.
- Use warm sitz baths and cool witch hazel compresses for comfort.

Constipation

- Increase your intake of foods high in fiber and drink at least eight 8-ounce glasses of fluid daily.
- Exercise each day (brisk walking) to promote movement through the intestine.
- Reduce the amount of cheese consumed.

Heartburn/Indigestion

- Avoid spicy or greasy foods and eat small frequent meals.
- Sleep on several pillows so that your head is elevated.
- Stop smoking and avoid caffeinated drinks to reduce stimulation.
- Avoid lying down for at least 2 hours after meals.
- Try drinking sips of water to reduce burning sensation.
- Take antacids sparingly if burning sensation is severe.

Braxton Hicks Contractions

- Keep in mind that these contractions are a normal sensation. Try changing your position or engaging in mild exercise to help reduce the sensation.
- Drink more fluids if possible.

NURSING CARE PLAN 12.1: Overview of the Woman Experiencing Common Discomforts of Pregnancy

Alicia, a 32-year-old, G1 P0, at 10 weeks' gestation, comes to the clinic for a visit. During the interview she tells you, "I'm running to the bathroom to urinate it seems like all the time, and I'm so nauseous that I'm having trouble eating." She denies any burning or pain on urination. Vital signs are within acceptable limits.

NURSING DIAGNOSIS: Impaired urinary elimination related to frequency secondary to physiologic changes of pregnancy

First-Trimester Discomforts

During the first 3 months of pregnancy, the woman's body is undergoing numerous changes. Some women experience many discomforts, but others have few. These discomforts are caused by the changes taking place within the body and they pass as the pregnancy progresses.

Outcome Identification and Evaluation

The client will report a decrease in urinary complaints, as evidenced by a decrease in the number of times she uses the bathroom to void, reports that she feels her bladder is empty after voiding, and use of Kegel exercises.

Interventions: *Promoting Normal Urinary Elimination Patterns*

- Assess client's usual bladder elimination patterns to establish a baseline for comparison.
- Obtain a urine specimen for analysis to rule out infection or glucosuria.
- Review with client the physiologic basis for the increased frequency during pregnancy; inform client that frequency should abate during the second trimester and that it most likely will return during her third trimester. This will promote understanding of the problem.
- Encourage the client to empty her bladder when first feeling a sensation of fullness to minimize risk of urinary retention.
- Suggest client avoid caffeinated drinks, which can stimulate the need to void.
- Encourage client to drink adequate amounts of fluid throughout the day; however, have client reduce her fluid intake before bedtime to reduce nighttime urination.
- Urge client to keep perineal area clean and dry to prevent irritation and excoriation from any leakage.
- Instruct client in Kegel exercises to increase perineal muscle tone and control over leakage.
- Teach client about the signs and symptoms of urinary tract infection and urge her to report them should they occur to ensure early detection and prompt intervention.

NURSING DIAGNOSIS: Imbalanced nutrition, less than body requirements, related to nausea and vomiting

Outcome Identification and Evaluation

The client will ingest adequate amounts of nutrients for maternal and fetal well-being as evidenced by acceptable weight gain pattern and statements indicating an increase in food intake with a decrease in the number of episodes of nausea and vomiting.

Interventions: *Promoting Adequate Nutrition*

- Obtain weight and compare to baseline to determine effects of nausea and vomiting on nutritional intake.
- Review client's typical dietary intake over 24 hours to determine nutritional intake and patterns so that suggestions can be individualized.
- Encourage client to eat five or six small frequent meals throughout the day to prevent her stomach from becoming empty.
- Suggest that she munch on dry crackers, toast, cereal, or cheese or drink a small amount of lemonade before arising to minimize nausea.
- Encourage client to arise slowly from bed in the morning and avoid sudden movements to reduce stimulation of the vomiting center.
- Advise client to drink fluids between meals rather than with meals to avoid overdistention of the abdomen and subsequent increase in abdominal pressure.
- Encourage her to increase her intake of foods high in vitamin B_6 such as meat, poultry, bananas, fish, green leafy vegetables, peanuts, raisins, walnuts, and whole grains, as tolerated, to ensure adequate nutrient intake.
- Advise the client to avoid greasy, fried, or highly spiced foods and to avoid strong odors, including foods such as cabbage, to minimize gastrointestinal upset.

- Encourage the client to avoid wearing tight or restricting clothes to minimize pressure on the expanding abdomen.
- Arrange for consultation with nutritionist as necessary to assist with diet planning.

Urinary Frequency or Incontinence

- Urinary frequency or incontinence is common in the first trimester because the growing uterus compresses the bladder. This also is a common complaint during the third trimester, especially when the fetal head settles into the pelvis. However, the discomfort tends to improve in the second trimester, when the uterus becomes an abdominal organ and moves away from the bladder region.
- After infection and gestational diabetes have been ruled out as causative factors of increased urinary frequency, suggest that the woman decrease her fluid intake 2 to 3 hours before bedtime and limit her intake of caffeinated beverages. Increased voiding is normal, but encourage the client to report any pain or burning during urination. Also explain that increased urinary frequency may subside as she enters her second trimester, only to recur in the third trimester. Teach the client to perform Kegel exercises throughout the day to help strengthen perineal muscle tone, thereby enhancing urinary control and decreasing the possibility of incontinence.

Fatigue

- Fatigue plagues all pregnant women, primarily in the first and third trimesters (the highest energy levels typically occur during the second trimester), even if they get their normal amount of sleep at night. First-trimester fatigue most often is related to the many physical changes (e.g., increased oxygen consumption, increased levels of progesterone and relaxin, increased metabolic demands) and psychosocial changes (e.g., mood swings, multiple role demands) of pregnancy. Third-trimester fatigue can be caused by sleep disturbances from increased weight (many women cannot find a comfortable sleeping position due to the enlarging abdomen), physical discomforts such as heartburn, and insomnia due to mood swings, multiple role anxiety, and a decrease in exercise (Trupin, 2011).
- Once anemia, infection, and blood dyscrasias have been ruled out as contributing to the client's fatigue, advise her to arrange work, child care, and other demands in her life to permit additional rest periods. Work with the client to devise a realistic schedule for rest. Using pillows for support in the side-lying position relieves pressure on major blood vessels that supply oxygen and nutrients to the fetus when resting (**Fig. 12.9**). Also recommend the use of relaxation techniques, providing instructions as necessary, and suggest she increase her daily exercise level.

FIGURE 12.9

Using pillows for support in the side-lying position.

Nausea and Vomiting

It is estimated that 70% to 80% of pregnant women experience nausea and vomiting. In the United States, this translates to approximately 4 million women. It is found more often in Western countries and urban populations, and is rare among Africans, Native Americans, Eskimos, and most Asian populations (Lee & Saha, 2011). The problem is generally time limited, with the onset about the fifth week after the last menstrual period, a peak at 8 to 12 weeks, and resolution by 16 to 18 weeks. Despite popular use of the term *morning sickness*, nausea and vomiting of pregnancy persists throughout the day in the majority of affected women and has been found to be limited to the morning in less than 2% of women (Jarvis & Nelson-Piercy, 2011). The physiologic changes that cause nausea and vomiting are unknown, but research suggests that unusually high levels of estrogen, progesterone, and hCG and a vitamin B_6 deficiency may be contributing factors. Symptoms generally last until the second trimester and are generally associated with a positive pregnancy outcome (Cunningham et al., 2010). In summary, the etiology of nausea and vomiting in pregnancy is physiologic, thus assessment of the condition focuses on severity, and the management is largely supportive.

The goal of treatment is to improve symptoms while minimizing risks to mother and fetus. Treatment management ranges from simple dietary modifications to drug therapy. To help alleviate nausea and vomiting, advise the woman to eat small, frequent meals that are bland and low in fat (five or six a day) to prevent her stomach from becoming completely empty. Other helpful suggestions include eating dry crackers, Cheerios, or cheese or drinking lemonade before getting out of bed in the morning and increasing her intake of foods high in vitamin B_6, such as meat, poultry, bananas, fish, green leafy vegetables, peanuts, raisins, walnuts, and whole grains, or making sure she is receiving enough vitamin B_6 by taking her prescribed prenatal vitamins.

Pharmacologic treatment might include the phenothiazines, chlorpromazine (Thorazine) and prochlorperazine (Compazine). They are central and peripheral dopamine antagonists that have been shown to reduce symptoms of nausea and vomiting of pregnancy. These agents are pregnancy category C (King & Brucker, 2011).

Other helpful tips to deal with nausea and vomiting include:

- Get out of bed in the morning very slowly.
- Avoid sudden movements.
- Eat a high-protein snack before retiring at night to prevent an empty stomach.
- Take ginger (up to 1 g daily), which increases tone and peristalsis in the GI tract.
- Open a window to remove odors of food being cooked.
- Eat more protein than carbohydrates and take in more liquids than solids.
- Limit intake of fluids or soups during meals (drink them between meals).
- Avoid fried foods and foods cooked with grease, oils, or fatty meats, because they tend to upset the stomach.
- Avoid highly seasoned foods such as those cooked with garlic, onions, peppers, and chili.
- Drink a small amount of caffeine-free carbonated beverage (ginger ale) if nauseated.
- Avoid strong smells.
- Avoid wearing tight or restricting clothes, which might place increased pressure on the expanding abdomen.
- Avoid stress (Latva-Pukkila, Isolauri, & Laitinen, 2010; Lee & Saha, 2011; Shrim, Weisz, Gindes, Dulitzki, & Almog, 2010).

Breast Tenderness

Due to increased estrogen and progesterone levels, which cause the fat layer of breasts to thicken and the number of milk ducts and glands to increase during the first trimester, many women experience breast tenderness. Offering a thorough explanation to the woman about the reasons for the breast discomfort is important. Wearing a larger bra with good support can help alleviate this discomfort. Advise her to wear a supportive bra, even while sleeping. As her breasts increase in size, advise her to change her bra size to ensure adequate support.

Constipation

Increasing levels of progesterone during pregnancy lead to decreased contractility of the gastrointestinal tract, slowed movement of substances through the colon, and a resulting increase in water absorption. All of these factors lead to constipation. Lack of exercise or too little fiber or fluids in the diet can also promote constipation. In addition, the large bowel is mechanically compressed by the enlarging uterus, adding to this discomfort. The iron and calcium in prenatal vitamins can also contribute to constipation during the first and third trimesters.

Explain how pregnancy exacerbates the symptoms of constipation and offer the following suggestions:

- Eat fresh or dried fruit daily.
- Eat more raw fruits and vegetables, including their skins.
- Eat whole-grain cereals and breads such as raisin bran or bran flakes.
- Participate in physical activity every day.
- Eat meals at regular intervals.
- Establish a time of day to defecate, and elevate your feet on a stool to avoid straining.
- Drink six to eight glasses of water daily.
- Decrease your intake of refined carbohydrates.
- Drink warm fluids on arising to stimulate bowel motility.
- Decrease your consumption of sugary sodas.
- Avoid eating large amounts of cheese.

If the suggestions above are ineffective, suggest that the woman use a bulk-forming laxative such as Metamucil.

Nasal Stuffiness, Bleeding Gums, Epistaxis

Increased levels of estrogen cause edema of the mucous membranes of the nasal and oral cavities. Advise the woman to drink extra water for hydration of the mucous membranes or to use a cool mist humidifier in her bedroom at night. If she needs to blow her nose to relieve nasal stuffiness, advise her to blow gently, one nostril at a time. Advise her to avoid the use of nasal decongestants and sprays.

If a nosebleed occurs, advise the woman to loosen the clothing around her neck, sit with her head tilted forward, pinch her nostrils with her thumb and forefinger for 10 to 15 minutes, and apply an ice pack to the bridge of her nose.

If the woman has bleeding gums, encourage her to practice good oral hygiene by using a soft toothbrush and flossing daily. Warm saline mouthwashes can relieve discomfort. If the gum problem persists, instruct her to see her dentist.

Cravings

Desires for certain foods and beverages are likely to begin during the first trimester but do not appear to reflect any physiologic need. Foods with a high sodium or sugar content often are the ones craved. At times, some women crave nonfood substances such as clay, cornstarch, laundry detergent, baking soda, soap, paint chips, dirt, ice, or wax. This craving for nonfood substances, termed *pica*, may indicate a

severe dietary deficiency of minerals or vitamins, or it may have cultural roots (Trupin, 2011). Pica is discussed in **Chapter 11**.

Leukorrhea

Increased vaginal discharge begins during the first trimester and continues throughout pregnancy. The physiologic changes behind leukorrhea arise from the high levels of estrogen, which cause increased vascularity and hypertrophy of cervical glands as well as vaginal cells (Cunningham et al., 2010). The result is progressively increasing vaginal secretions throughout pregnancy.

Advise the woman to keep the perineal area clean and dry, washing the area with mild soap and water during her daily shower. Also recommend that she avoid wearing pantyhose and other tight-fitting nylon clothes that prevent air from circulating to the genital area. Encourage the use of cotton underwear and suggest wearing a nightgown rather than pajamas to allow for increased airflow. Also instruct the woman to avoid douching and tampon use.

Second-Trimester Discomforts

A sense of well-being typically characterizes the second trimester for most women. By this time, the fatigue, nausea, and vomiting have subsided and the uncomfortable changes of the third trimester are a few months away. Not every woman experiences the same discomforts during this time, so nursing assessments and interventions must be individualized.

Backache

Half of women report having back pain at some point during pregnancy. The pain can be lumbar or sacroiliac. The pain may also be present only at night. Back pain is thought to be due to multiple factors, which include shifting of the center of gravity caused by the enlarging uterus, increased joint laxity due to an increase in relaxin, stretching of the ligaments (which are pain-sensitive structures), and pregnancy-related circulatory changes.

Treatment is heat and ice, acetaminophen, massage, proper posturing, good support shoes, and a good exercise program for strength and conditioning. Pregnant women may also relieve back pain by placing one foot on a stool when standing for long periods of time and placing a pillow between the legs when lying down (Vermani, Mittal, & Weeks, 2010).

After exploring other reasons that might cause backache, such as uterine contractions, urinary tract infection, ulcers, or musculoskeletal back disorders, the following instructions may be helpful:

- Maintain correct posture, with head up and shoulders back.
- Wear low-heeled shoes with good arch support.
- When standing for long periods, place one foot on a stool or box.
- Use good body mechanics when lifting objects.
- When sitting, use foot supports and pillows behind the back.

- Try pelvic tilt or rocking exercises to strengthen the back (ACOG, 2011b).

The pelvic tilt or pelvic rock is used to alleviate pressure on the lower back during pregnancy by stretching the lower back muscles. It can be done sitting, standing, or on all fours. To do it on all fours, the hands are positioned directly under the shoulders and the knees under the hips. The back should be in a neutral position with the head and neck aligned with the straight back. The woman then presses up with the lower back and holds this position for a few seconds, then relaxes to a neutral position. This action of pressing upward is repeated frequently throughout the day to prevent a sore back (ACOG, 2011b).

Leg Cramps

Many women experience leg cramps in pregnancy. They become more common as pregnancy progresses and are especially troublesome at night. They occur primarily in the second and third trimesters and could be related to the pressure of the gravid uterus on pelvic nerves and blood vessels. During pregnancy, up to 30% of women can be affected by leg cramps, and up to 25% can be affected by restless legs syndrome (Young & Jewell, 2011). Diet can also be a contributing factor if the woman is not consuming enough of certain minerals, such as calcium and magnesium. The sudden stretching of leg muscles may also play a role in causing leg cramps (Trupin, 2011).

Encourage the woman to gently stretch the muscle by dorsiflexing the foot up toward the body. Wrapping a warm, moist towel around the leg muscle can also help the muscle to relax. Advise the client to avoid stretching her legs, pointing her toes, and walking excessively. Stress the importance of wearing low-heeled shoes and support hose and arising slowly from a sitting position. If the leg cramps are due to deficiencies in minerals, the condition can be remedied by eating more foods rich in these nutrients. Also instruct the woman on calf-stretching exercises: have her stand 3 feet from the wall and lean toward it, resting her lower arms against it, while keeping her heels on the floor. This may help reduce cramping if it is done before going to bed.

Elevating the legs throughout the day will help relieve pressure and minimize strain. Wearing support hose and avoiding curling the toes may help to relieve leg discomfort. Also instruct the client to avoid standing in one spot for a prolonged period or crossing her legs. If she must stand for prolonged periods, suggest that she change her position at least every 2 hours by walking or sitting to reduce the risk of leg cramps. Encourage her to drink eight 8-ounce glasses of fluid throughout the day to ensure adequate hydration. Taking daily walks can also help reduce leg cramping because ambulation improves circulation to the muscles.

Varicosities of the Vulva and Legs

Varicosities of the vulva and legs are associated with the increased venous stasis caused by the pressure of the gravid uterus on pelvic vessels and the vasodilation resulting from increased progesterone levels. Progesterone relaxes the vein walls, making it difficult for blood to return to the heart from the extremities; pooling can result. Genetic predisposition, inactivity, obesity, and poor muscle tone are contributing factors.

Encourage the client to wear support hose and teach her how to apply them properly. Advise her to elevate her legs above her heart while lying on her back for 10 minutes before she gets out of bed in the morning, thus promoting venous return before she applies the hose. Instruct the client to avoid crossing her legs and avoid wearing knee-high stockings. They cause constriction of leg vessels and muscles and contribute to venous stasis. Also encourage the client to elevate both legs above the level of the heart for 5 to 10 minutes at least twice a day (**Fig. 12.10**); to wear low-heeled shoes; and to avoid long periods of standing or sitting, frequently changing her position. If the client has vulvar varicosities, suggest she apply ice packs to the area when she is lying down. See **Evidence-Based Practice 12.2**.

FIGURE 12.10

Woman elevating her legs while working.

EVIDENCE-BASED PRACTICE 12.2: INTERVENTIONS FOR VARICOSE VEINS AND LEG EDEMA IN PREGNANCY

STUDY

Pregnancy is presumed to be a major contributory factor in the increased incidence of varicose veins in women, which can in turn lead to venous insufficiency and leg edema. The most common symptom of varicose veins and edema is substantial pain, as well as night cramps, numbness, and tingling; also, the legs may feel heavy and achy and the veins may be unsightly.

Varicose veins, sometimes called varicosity, occur when a valve in the blood vessel walls weakens and the blood stagnates. This leads to problems with the circulation in the veins and to edema or swelling. The vein then becomes distended and its walls stretch and sag, allowing the vein to swell into a tiny balloon near the surface of the skin. The veins in the legs are most commonly affected as they are working against gravity, but the vulva (vaginal opening) or rectum, resulting in hemorrhoids (piles), can be affected too.

Treatment of varicose veins is usually divided into three main groups: surgery, pharmacologic, and nonpharmacologic treatments. Treatment for leg edema mostly involves symptom reduction rather than cure and uses pharmacologic and nonpharmacologic approaches.

The review identified three trials involving 159 women. Although the drug rutoside seemed to be effective in reducing symptoms, the study was too small to be able to say this with real confidence. Similarly, with compression stockings and reflexology, insufficient data were available to be able to assess benefits and harms, but they looked promising. More research is needed.

Findings

Rutoside appears to relieve the symptoms of varicose veins in late pregnancy. However, this finding is based on one small study (69 women), and there are not enough data presented in the study to assess its safety in pregnancy. It therefore cannot be routinely recommended. Reflexology appears to improve symptoms for women with leg edema, but again this is based on one small study (43 women). External compression stockings do not appear to have any advantages in reducing edema.

Nursing Implications

Nurses can use this evidence to instruct women about varicose veins and outline the various therapies available to treat them. It is not clear that any of the therapies are totally successful in relieving the discomfort associated with varicose veins, based on this analysis, but comfort therapies can be covered to help with the discomfort. Maintaining an ideal weight gain throughout the pregnancy will also help reduce the risk of varicose vein formation.

Adapted from Bamigboye, A. A., & Smyth, R. (2010). Interventions for varicose veins and leg edema in pregnancy. *Cochrane Database of Systematic Reviews 2010*(1). doi:10.1002/14651858.CD001066.pub2.

Hemorrhoids

Hemorrhoids are varicosities of the rectum and may be external (outside the anal sphincter) or internal (above the sphincter) (ACOG, 2011e). They occur as a result of progesterone-induced vasodilation and from pressure of the enlarged uterus on the lower intestine and rectum. Hemorrhoids are more common in women with constipation, poor fluid intake or poor dietary habits, smokers, or those with a previous history of hemorrhoids (Avsar & Keskin, 2010).

Instruct the client in measures to prevent constipation, including increasing fiber intake and drinking at least 2 liters of fluid per day. Recommend the use of topical anesthetics (e.g., Preparation H, Anusol, witch hazel compresses) to reduce pain, itching, and swelling, if permitted by the health care provider. Teach the client about local comfort measures such as warm sitz baths, witch hazel compresses, or cold compresses. To minimize her risk of straining while defecating, suggest that she elevate her feet on a stool. Also encourage her to avoid prolonged sitting or standing (ACOG, 2011e).

Flatulence With Bloating

The physiologic changes that result in constipation (reduced gastrointestinal motility and dilation secondary to progesterone's influence) may also result in increased flatulence. As the enlarging uterus compresses the bowel, it delays the passage of food through the intestines, thus allowing more time for gas to be formed by bacteria in the colon. The woman usually reports increased passage of rectal gas, abdominal bloating, or belching. Instruct the woman to avoid gas-forming foods, such as beans, cabbage, and onions, as well as foods that have a high content of white sugar. Adding more fiber to the diet, increasing fluid intake, and increasing physical exercise are also helpful in reducing flatus. In addition, reducing the amount of swallowed air when chewing gum or smoking will reduce gas buildup. Reducing the intake of carbonated beverages and cheese and eating mints can also help reduce flatulence during pregnancy (Trupin, 2011).

Third-Trimester Discomforts

As women enter their third trimester, many experience a return of the first-trimester discomforts of fatigue, urinary frequency, leukorrhea, and constipation. These discomforts are secondary to the ever-enlarging uterus compressing adjacent structures, increasing hormone levels, and the metabolic demands of the fetus. In addition to these discomforts, many women experience shortness of breath, heartburn and indigestion, swelling, and Braxton Hicks contractions.

Shortness of Breath and Dyspnea

The increasing growth of the uterus prevents complete lung expansion late in pregnancy. As the uterus enlarges upward, the expansion of the diaphragm is limited. Dyspnea can occur when the woman lies on her back and the pressure of the gravid uterus against the vena cava reduces venous return to the heart (Gilbert, 2011).

Explain to the woman that dyspnea is normal and will improve when the fetus drops into the pelvis (lightening). Instruct her to adjust her body position to allow for maximum expansion of the chest and to avoid large meals, which increase abdominal pressure. Raising the head of the bed on blocks or placing pillows behind her back is helpful too. Under normal circumstances, resting with the head elevated while taking slow, deep breaths reduces shortness of breath symptoms. In addition, stress that lying on her side will displace the uterus off the vena cava and improve her breathing. Advise the woman to avoid exercise that precipitates dyspnea, to rest after exercise, and to avoid overheating in warm climates. If she still smokes, encourage her to stop.

Heartburn and Indigestion

Heartburn and indigestion result when high progesterone levels cause relaxation of the cardiac sphincter, allowing food and digestive juices to flow backward from the stomach into the esophagus. Irritation of the esophageal lining occurs, causing the burning sensation known as heartburn. It occurs in up to 70% of women at some point during pregnancy, with an increased frequency seen in the third trimester (Law, Maltepe, Bozzo, & Einarson, 2010). The pain may radiate to the neck and throat. It worsens when the woman lies down, bends over after eating, or wears tight clothes. Indigestion (vague abdominal discomfort after meals) results from eating too much or too fast; from eating when tense, tired, or emotionally upset; from eating food that is too fatty or spicy; and from eating heavy food or food that has been badly cooked or processed (Trupin, 2011). In addition, the stomach is displaced upward and compressed by the large uterus in the third trimester, thus limiting the stomach's capacity to empty quickly. Food sits, causing heartburn and indigestion.

Review the client's usual dietary intake and suggest that she limit or avoid gas-producing or fatty foods and large meals. Instruct the woman to pay attention to the timing of the discomfort. Usually it is heartburn when the pain occurs 30 to 45 minutes after a meal. Encourage the client to maintain proper posture and remain in the sitting position for 1 to 3 hours after eating to prevent reflux of gastric acids into the esophagus by gravity. Urge the client to eat slowly, chewing her food thoroughly to prevent excessive swallowing of air, which can lead to increased gastric pressure. Instruct the client to avoid foods that act as triggers such as caffeinated drinks, citrus, spiced foods, chocolate, coffee, alcohol, and spearmint or peppermint. These items stimulate the release of gastric digestive acids, which may cause reflux into the esophagus. Avoid late-night or large meals and gum chewing.

Dependent Edema

Swelling is the result of increased capillary permeability caused by elevated hormone levels and increased blood volume. Sodium and water are retained and thirst increases. Edema occurs most often in dependent areas such as the legs and feet throughout the day due to gravity; it improves after a

night's sleep. Warm weather or prolonged standing or sitting may increase edema. Generalized edema, appearing in the face, hands, and feet, can signal preeclampsia if accompanied by dizziness, blurred vision, headaches, upper quadrant pain, or nausea (Trupin, 2011). This edema should be reported to the health care provider.

Appropriate suggestions to minimize dependent edema include:

- Elevate your feet and legs above the level of the heart.
- Wear support hose when standing or sitting for long periods.
- Change position frequently throughout the day.
- Walk at a sensible pace to help contract leg muscles to promote venous return.
- When taking a long car ride, stop to walk around every 2 hours.
- When standing, rock from the ball of the foot to the toes to stimulate circulation.
- Lie on your left side to keep the gravid uterus off the vena cava to return blood to the heart.
- Avoid foods high in sodium, such as lunch meats, potato chips, and bacon.
- Avoid wearing knee-high stockings.
- Drink six to eight glasses of water daily to replace fluids lost through perspiration.
- Avoid high intake of sugar and fats, because they cause water retention.

Braxton Hicks Contractions

Braxton Hicks contractions are irregular, painless contractions that occur without cervical dilation. Typically they intensify in the third trimester in preparation for labor. In reality, they have been present since early in the pregnancy but may have gone unnoticed. They are thought to increase the tone of uterine muscles for labor purposes (ACOG, 2011d).

Reassure the client that these contractions are normal. Instruct the client in how to differentiate between Braxton Hicks and labor contractions. Explain that true labor contractions usually grow longer, stronger, and closer together and occur at regular intervals. Walking usually strengthens true labor contractions, whereas Braxton Hicks contractions tend to decrease in intensity and taper off. Advise the client to keep herself well hydrated and to rest in a side-lying position to help relieve the discomfort. Suggest that she use breathing techniques such as Lamaze techniques to ease the discomfort.

Consider This

One has to wonder sometimes why women go through what they do. During my first pregnancy I was sick for the first 2 months. I would experience waves of nausea from the moment I got out of bed until midmorning. Needless to say, I wasn't the happiest camper around. After the third month, my life seemed to settle down and I was beginning to think that being pregnant wasn't too bad after all. For the

moment, I was fooled. Then, during my last 2 months, another wave of discomfort struck—heartburn and constipation—a double whammy! I now feared eating anything that might trigger acid indigestion and also might remain in my body too long. I literally had to become the "fiber queen" to combat these two challenges. Needless to say, my "suffering" was well worth our bright-eyed baby girl in the end.

Thoughts: Despite the various discomforts associated with pregnancy, most women wouldn't change their end result. Do most women experience these discomforts? What suggestions could be made to reduce them?

NURSING MANAGEMENT TO PROMOTE SELF-CARE

Pregnancy is considered a time of health, not illness. Health promotion and maintenance activities are key to promoting an optimal outcome for the woman and her fetus.

Pregnant women commonly have many questions about the changes occurring during pregnancy: how these changes affect their usual routine, such as working, traveling, exercising, or engaging in sexual activity; how the changes influence their typical self-care activities, such as bathing, perineal care, or dental care; and whether these changes are signs of a problem.

Take Note!

Women may have heard stories about or been told by others what to do and what not to do during pregnancy, leading to many misconceptions and much misinformation.

Nurses can play a major role in providing anticipatory guidance and teaching to foster the woman's responsibility for self-care, helping to clarify misconceptions and correct any misinformation. Educating the client to identify threats to safety posed by her lifestyle or environment and proposing ways to modify them to avoid a negative outcome are important. Counseling should also include healthy ways to prepare food, advice to avoid medications unless they are prescribed for her, and advice on identifying teratogens within her environment or at work and how to reduce her risk from exposure. The pregnant client can better care for herself and the fetus if her concerns are anticipated and identified by the nurse and are incorporated into teaching sessions at each prenatal visit.

Personal Hygiene

Hygiene is a necessity for the maintenance of good health. Cleansing the skin removes dirt, bacteria, sweat, dead skin cells, and body secretions. Counsel women to wash their hands and under their fingernails frequently throughout the day to lower the bacterial count on both. During pregnancy a woman's sebaceous (sweat) glands become more active under the influence of hormones, and sweating

is more profuse. This increase may make it necessary to use a stronger deodorant and shower more frequently. The cervical and vaginal glands also produce more secretions during pregnancy. Frequent showering helps to keep the area dry and promotes better hygiene. Encourage the use of cotton underwear to allow greater air circulation. Taking a tub bath in early pregnancy is permitted, but closer to term, when the woman's center of gravity shifts, it is safer to shower to prevent the risk of slipping.

Hot Tubs and Saunas

Caution pregnant women to avoid using hot tubs, saunas, whirlpools, and tanning beds during pregnancy. The heat may cause fetal tachycardia as well as raise the maternal temperature. Exposure to bacteria in hot tubs that have not been cleaned sufficiently is another reason to avoid them during pregnancy.

Perineal Care

The glands in the cervical and vaginal areas become more active during pregnancy secondary to hormonal influences. This increase in activity will produce more vaginal secretions, especially in the last trimester. Advise pregnant women to shower frequently and wear all-cotton underwear to minimize the effects of these secretions. Caution pregnant women not to douche, because douching can increase the risk of infection, and not to wear panty liners, which block air circulation and promote moisture. Explain that they should also avoid perfumed soaps, lotions, perineal sprays, and harsh laundry detergents to help prevent irritation and potential infection.

Dental Care

Periodontal disease is a contributing factor to systemic conditions, such as heart disease, respiratory diseases, diabetes mellitus, adverse pregnancy outcomes (preterm births, low-birth-weight infants, and small-for-gestational-age infants), and stroke (Wooten, Lee, Jared, Boggers, & Wilder, 2011). Research has established that the elevated levels of estrogen and progesterone during pregnancy cause women to be more sensitive to the effects of bacterial dental plaque, which can cause gingivitis, an oral infection characterized by swollen and bleeding gums (Lachat, Solnik, Nana, & Citron, 2011). Brushing and flossing teeth twice daily will help reduce bacteria in the mouth. Advise the woman to visit her dentist early in the pregnancy to address any dental caries and have a thorough cleaning to prevent possible infection later in the pregnancy. Advise her to avoid exposure to x-rays by informing the hygienist of the pregnancy. If x-rays are necessary, the abdomen should be shielded with a lead apron.

Researchers have reported an association between prematurity and periodontitis, an oral infection that spreads beyond the gum tissues to invade the supporting structures of the teeth. Periodontitis is characterized by bleeding gums, loss of tooth attachment, loss of supporting bone, and bad breath due to pus formation. Unfortunately, because this infection is chronic and often painless, women frequently do not realize they have it and a preterm birth can result (Han, 2011). Additional guidelines that the nurse should stress regarding maintaining dental health include:

- Seek professional dental care during the first trimester for assessment and care.
- Obtain treatment for dental pain and infection promptly during pregnancy.
- Brush twice daily for 2 minutes, especially before bed, with fluoridated toothpaste and rinse well. Use a soft-bristled toothbrush and be sure to brush at the gum line to remove food debris and plaque to keep gums healthy.
- Floss teeth daily with dental floss and rinse well afterward with plain water.
- Eat healthy foods, especially those high in vitamins A, C, and D and calcium.
- Avoid sugary snacks.
- Chew sugar-free gum for 10 minutes after a meal if brushing is not possible.
- After vomiting, rinse your mouth immediately with baking soda (1/4 teaspoon) and warm water (1 cup) to neutralize the acid (American Academy of Pediatric Dentistry, 2011).

Breast Care

Because the breasts enlarge significantly and become heavier throughout pregnancy, stress the need to wear a firm, supportive bra with wide straps to balance the weight of the breasts. Instruct the woman to anticipate buying a larger-sized bra about halfway through her pregnancy because of the increasing size of the breasts. Advise her to avoid using soap on the nipple area because it can be very drying. Encourage her to rinse the nipple area with plain water while bathing to keep it clean. The Montgomery glands secrete a lubricating substance that keeps the nipples moist and discourages growth of bacteria, so there is no need to use alcohol or other antiseptics on the nipples.

If the mother has chosen to breast-feed, nipple preparation is unnecessary unless her nipples are inverted and do not become erect when stimulated. Breast shells can be worn during the last 2 months to address this issue (Alexander et al., 2010).

Around week 16 of pregnancy, colostrum secretion begins, which the woman may notice as moisture in her bra. Advise the woman to place breast pads or a cotton cloth in her bra and change them frequently to prevent build-up, which may lead to excoriation.

Clothing

Many contemporary clothes are loose fitting and layered, so the woman may not need to buy an entirely new wardrobe to accommodate her pregnancy. Some pregnant women may continue to wear tight clothes. Point out that loose clothing will be more comfortable for the client and her expanding waistline.

Advise pregnant women to avoid wearing constricting clothes and girdles that compress the growing abdomen. Urge the woman to avoid knee-high hose, which might impede lower-extremity circulation and increase the risk of developing DVT. Low-heeled shoes will minimize pelvic tilt and possible backache. Wearing layered clothing that can be removed as the temperatures fluctuate may be more comfortable, especially toward term, when the woman may feel overheated.

Exercise

Exercise is well tolerated by a healthy woman during pregnancy. It promotes a feeling of well-being; improves circulation; helps reduce constipation, bloating, and swelling; may help prevent or treat gestational diabetes; promotes muscle tone, strength, and endurance; may improve the woman's ability to cope with labor; increases energy level; improves posture; helps sleep and promotes relaxation and rest; and relieves the lower back discomfort that often arises as the pregnancy progresses (ACOG, 2011c). However, the duration and difficulty of exercise should be modified throughout pregnancy because of a decrease in performance efficiency with gestational age. Some women continue to push themselves to maintain their prior level of exercise, but most find that as their shape changes and their abdominal area enlarges, they must modify their exercise routines. Modification also helps to reduce the risk of injury caused by laxity of the joints and connective tissue due to the hormonal effects (ACOG, 2011c).

Exercise during pregnancy is contraindicated in women with preterm labor, poor weight gain, anemia, facial and hand edema, pain, hypertension, threatened abortion, dizziness, shortness of breath, multiple gestation, decreased fetal activity, cardiac disease, and palpitations (Trupin, 2011).

ACOG (2011c) has stated that healthy pregnant women can perform the same activity recommended for the general population: 30 minutes or more of moderate exercise every day (**Fig. 12.11**). It is believed that pregnancy is a unique time for behavior modification and that healthy behaviors maintained or adopted during pregnancy may improve the woman's health for the rest of her life. The excess weight gained in pregnancy, which some women never lose, is a major public health problem (Trupin, 2011). Exercise helps the woman avoid gaining excess weight during pregnancy.

FIGURE 12.11

Exercising during pregnancy.

Exercise during pregnancy helps return a woman's body to good health after the baby is born. The long-term benefits of exercise that begin in early pregnancy include improved posture, weight control, and improved muscle tone. Exercise also aids in the prevention of osteoporosis after menopause, reduces the risk of hypertension and diabetes, and assists in keeping the birth weight of the fetus within the normal range (Zavorsky & Longo, 2011). Teaching Guidelines 12.2 highlights recommendations for exercise during pregnancy.

Teaching Guidelines 12.2: TEACHING TO PROMOTE EXERCISE DURING PREGNANCY

- Consume liquids before, during, and after exercising.
  - Ask your health care provider before you start a new exercise routine.
  - Avoid exercising in hot, humid weather or when you have a fever.
  - Stop exercising if you experience vaginal bleeding, dizziness, chest pain, headache, muscle weakness, calf pain or swelling, uterine contractions, decreased fetal movement, or fluid leaking from the vagina.
- Exercise three or four times each week, not sporadically.

- Engage in brisk walking, swimming, biking, or low-impact aerobics; these are considered ideal activities.
- Avoid getting overheated during exercise.
- Reduce the intensity of workouts in late pregnancy.
- Avoid jerky, bouncy, or high-impact movements.
- Avoid lying flat (supine) after the fourth month because of hypotensive effect.
- Use pelvic tilt and pelvic rocking to relieve backache.
- Start with 5 to 10 minutes of stretching exercises.
- Rise slowly following an exercise session to avoid dizziness.
- Avoid activities such as skiing, surfing, scuba diving, and ice hockey.
- Never exercise to the point of exhaustion.

Adapted from American College of Obstetricians and Gynecologists. (2011c). *Exercise during pregnancy*. Retrieved from **http://www.acog.org/publications/patient_education/bp119.cfm**; American Pregnancy Association. (2011). *Exercise guidelines during pregnancy*. Retrieved from **http://www.americanpregnancy.org/pregnancyhealth/exerciseguidelines.html**; and Zavorsky, G. S., & Longo, L. D. (2011). Exercise guidelines in pregnancy. *Sports Medicine, 41*(5), 345–360.

Sleep and Rest

Getting enough sleep helps a person feel better and promotes optimal performance levels during the day. The body releases its greatest concentration of growth hormone during sleep, helping the body to repair damaged tissue and grow. Also, with the increased metabolic demands during pregnancy, fatigue is a constant challenge to many pregnant women, especially during the first and third trimesters.

The following tips can help promote adequate sleep:

- Stay on a regular schedule by going to bed and waking up at the same times.
- Eat regular meals at regular times to keep external body cues consistent.
- Take time to unwind and relax before bedtime.
- Establish a bedtime routine or pattern and follow it.
- Create a proper sleep environment by reducing the light and lowering the room temperature.
- Go to bed when you feel tired; if sleep does not occur, read a book until you are sleepy.
- Reduce caffeine intake later in the day.
- Limit fluid intake after dinner to minimize trips to the bathroom.
- Exercise daily to improve circulation and well-being.
- Use a modified Sims position to improve circulation in the lower extremities.
- Avoid lying on your back after the fourth month, which may compromise circulation to the uterus.
- Avoid sharply bending your knees, which promotes venous stasis below the knees.
- Keep anxieties and worries out of the bedroom. Set aside a specific area in the home or time of day for them.

Sexual Activity and Sexuality

Sexuality is an important part of health and well-being. Pregnancy is characterized by intense biologic, psychological, and social changes. These changes have direct and indirect, conscious and unconscious effects on a woman's sexuality. The woman experiences dramatic alterations in her physiology, her appearance, and her body, as well as her relationships. A woman's sexual responses during pregnancy vary widely. Common symptoms such as fatigue, nausea, vomiting, breast soreness, and urinary frequency may reduce her desire for sexual intimacy. However, many women report enhanced sexual desire due to increasing levels of estrogen. Usually sexual satisfaction does not change in pregnancy compared with the prepregnancy patterns despite a decline of sexual activity during the third trimester. A discussion of expected changes in sexuality should be routinely done in order to improve couples' perception of possible sexual modifications induced by pregnancy.

Take Note!

Fluctuations in sexual desire are normal and a highly individualized response throughout pregnancy.

The physical and emotional adjustments of pregnancy can cause changes in body image, fatigue, mood swings, and sexual activity. The woman's changing shape, emotional status, fetal activity, changes in breast size, pressure on the bladder, and other common discomforts of pregnancy result in increased physical and emotional demands. These can produce stress on the sexual relationship of the pregnant woman and her partner. However, most women adjust well to the alterations and experience a satisfying sexual relationship (ACOG, 2011g).

Often pregnant women ask whether sexual intercourse is allowed during pregnancy or whether there are specific times when they should refrain from having sex. This is a good opportunity to educate clients about sexual behavior during pregnancy and also to ask about their expectations and individual experience related to sexuality and possible changes. It is also a good time for nurses to address the impact of the changes associated with pregnancy on sexual desire and behavior. Couples may enjoy sexual activity more because there is no fear of pregnancy and no need to disrupt spontaneity by using birth control. An increase in pelvic congestion and lubrication secondary to estrogen influence may heighten orgasm for many women. Some women have a decrease in desire because of a negative body image, fear of harming the fetus by engaging in intercourse, and fatigue, nausea, and vomiting (Trupin, 2011). Condom use can be recommended to decrease the release of prostaglandins in the semen that may stimulate contractions. A couple may need assistance to adjust to the various changes brought about by pregnancy.

Reassure the women and her partner that sexual activity is permissible during pregnancy unless there is a history of any of the following:

- Vaginal bleeding
- Placenta previa
- Risk of preterm labor

- Cervical insufficiency
- Premature rupture of membranes
- Presence of infection (Trupin, 2011)

Inform the couple that the fetus will not be injured by intercourse. Suggest that alternative positions may be more comfortable (e.g., woman on top, side-lying), especially during the later stages of pregnancy. Some of the physical changes in pregnancy, which can affect a couple's relationship, for example, halitosis which can result from dehydration, but can be alleviated through extra fluids and better oral hygiene. Women can have breast tenderness and skin changes that can cause them feel unattractive to their partner during pregnancy. In addition, they can be worried about increases in vaginal discharge and need to know what is normal and what can be a sign of infection. Nurses should make women feel comfortable talking about their fears, encouraging them to take pride in their changing bodies.

Many women feel a particular need for closeness during pregnancy, and the woman should communicate this need to her partner (Pauleta, Pereira, & Graca, 2010). Emphasize to the couple that closeness and cuddling need not culminate in intercourse, and that other forms of sexual expression, such as mutual masturbation, foot massage, holding hands, kissing, and hugging can be very satisfying (Pauleta, Pereira, & Graça, 2010).

Sex in pregnancy is normal. There are very few proven contraindications and risks to intercourse in low-risk pregnancies, and therefore these clients should be reassured. In pregnancies complicated by placenta previa or an increased risk of preterm labor, the evidence to support abstinence is lacking, but it is a reasonable benign recommendation given the theoretical catastrophic consequences (Jones, Chan, & Farine, 2011).

Women will experience a myriad of symptoms, feelings, and physical sensations during their pregnancy. Having a satisfying sexual relationship during pregnancy is certainly possible, but it requires honest communication between partners to determine what works best for them and a good relationship with their health care provider to ensure safety (March of Dimes, 2011e).

Employment

For the most part, women can continue working until delivery if they have no complications during their pregnancy and the workplace does not present any special hazards (March of Dimes, 2011g). Hazardous occupations include health care workers, daycare providers, laboratory technicians, chemists, painters, hairstylists, veterinary workers, and carpenters (March of Dimes, 2011g). Jobs requiring strenuous work such as heavy lifting, climbing, carrying heavy objects, and standing for prolonged periods place a pregnant woman at risk if modifications are not instituted.

Assess for environmental and occupational factors that place a pregnant women and her fetus at risk for injury. Interview the woman about her employment environment. Ask about possible exposure to teratogens (substances with the potential to alter the fetus permanently in form or function) and the physical demands of employment: Is she exposed to temperature extremes? Does she need to stand for prolonged periods in a fixed position? A description of the work environment is important in providing anticipatory guidance to the woman. Stress the importance of taking rest periods throughout the day,

because constant physically intensive workloads increase the likelihood of low birth weight and preterm labor and birth (Cunningham et al., 2010).

Due to the numerous physiologic and psychosocial changes that women experience during their pregnancies, the employer may need to make special accommodations to reduce the pregnant woman's risk of hazardous exposures and heavy workloads. The employer may need to provide adequate coverage so that the woman can take rest breaks; remove the woman from any areas where she might be exposed to toxic substances; and avoid work assignments that require heavy lifting, hard physical labor, continuous standing, or constant moving. Some recommendations for working while pregnant are given in **Teaching Guidelines 12.3**.

Teaching Guidelines 12.3: TEACHING FOR THE PREGNANT WORKING WOMAN

- Plan to take two 10- to 15-minute breaks within an 8-hour workday.
- Be sure there is a place available for you to rest, preferably in the side-lying position, with a restroom readily available.
- Avoid jobs that require strenuous workloads; if this is not possible, then request a modification of work duties (lighter tasks) to reduce your workload.
- Change your position from standing to sitting or vice versa at least every 2 hours.
- Ensure that you are allowed time off without penalty, if necessary, to ensure a healthy outcome for you and your fetus.
- Make sure the work environment is free of toxic substances.
- Ensure the work environment is smoke-free so passive smoking is not a concern.
- Minimize heavy lifting if associated with bending.

Travel

Pregnancy does not curtail a woman's ability to travel in a car or in a plane. However, women should follow a few safety guidelines to minimize risk to themselves and their fetuses. According to ACOG (2011h), pregnant women can travel safely throughout their pregnancy, although the second trimester is perhaps the best time to travel because there is the least chance of complications. Pregnant women considering international travel should evaluate the problems that could occur during the journey as well as the quality of medical care available at the destination.

A woman in the third trimester should be advised to defer overseas travel because of concerns about access to medical care in case of problems such as hypertension, phlebitis,

or premature labor (CDC, 2011d). Pregnant women should be advised to consult with their health care providers before making any travel decisions.

Take Note!

Clinical manifestations that indicate the need for immediate medical attention while traveling are vaginal bleeding, passing tissue or clots, abdominal pain or cramps, contractions, ruptured membranes, excessive leg swelling or pain, headaches, or visual problems (CDC, 2011d).

Advise pregnant women to be aware of the potential for injuries and traumas related to traveling, and teach women ways to prevent these from occurring. **Teaching Guidelines 12.4** offers tips for safe travel on planes and to foreign areas.

Teaching Guidelines 12.4: TEACHING TO PROMOTE SAFE TRAVEL ON PLANES AND IN FOREIGN COUNTRIES

- Bring along a copy of the prenatal record if your travel will be prolonged in case there is a medical emergency away from home.
- When traveling abroad, carry a foreign dictionary that includes words or phrases for the most common pregnancy emergencies.
- Travel with at least one companion at all times for personal safety.
- Check with your health care provider before receiving any immunizations necessary for foreign travel; some may be harmful to the fetus.
- When in a foreign country, avoid fresh fruit, vegetables, and local water.
- Avoid any milk that is not pasteurized.
- Eat only meat that is well cooked to avoid exposure to toxoplasmosis.
- Request an aisle seat and walk about the airplane every 2 hours.
- While sitting on long flights, practice calf-tensing exercises to improve circulation to the lower extremities.
- Be aware of typical problems encountered by pregnant travelers, such as fatigue, heartburn, indigestion, constipation, vaginal discharge, leg cramps, urinary frequency, and hemorrhoids.
- Always wear support hose while flying to prevent the development of blood clots.
- Drink plenty of water to keep well hydrated throughout the flight.

Adapted from American College of Obstetricians and Gynecologists. (2011h). *Travel during pregnancy: FAQ 055*. Retrieved from **http://www.acog.org/~/media/for%20patients/faq055.ashx**; and American Pregnancy Association. (2012). *Pregnancy and travel*. Retrieved from **http://www.americanpregnancy.org/pregnancyhealth/travel.html**.

When traveling by car, the major risk is a car accident. The impact and momentum can lead to traumatic separation of the placenta from the wall of the uterus. Shock and massive hemorrhage might result (Trupin, 2011). Tips that nurses can offer to promote safety during ground travel include:

- Always wear a three-point seat belt, no matter how short the trip, to prevent ejection or serious injury from collision.
- Apply a nonpadded shoulder strap properly; it should cross between the breasts and over the upper abdomen, above the uterus (**Fig. 12.12**).

FIGURE 12.12

Proper application of a seat belt during pregnancy.

- If no seat belts are available (buses or vans), ride in the back seat of the vehicle.
- Use a lap belt that crosses over the pelvis below the uterus.
- Deactivate the airbag if possible. If you can't, move the seat as far back from the dashboard as possible to minimize impact on the abdomen.
- Avoid using a cellular phone while driving to prevent distraction.
- Avoid driving when very fatigued in the first and third trimesters.
- Avoid late-night driving, when visibility might be compromised.
- Direct a tilting steering wheel away from the abdomen (CDC, 2011d).

Immunizations and Medications

Ideally, clients should receive all childhood immunizations before conception to protect the fetus from any risk of congenital anomalies. If the client comes for a preconception visit, discuss immunizations such as measles, mumps, and rubella (MMR), hepatitis B, and diphtheria/tetanus (every 10 years); administer them at this time if needed.

The risk to a developing fetus from vaccination of the mother during pregnancy is primarily theoretical. Routine immunizations are not usually indicated during pregnancy. However, no evidence exists of risk from vaccinating pregnant women with inactivated virus or bacterial vaccines or toxoids. A number of other vaccines have not been adequately studied, and thus theoretical risks of vaccination must be weighed against the risks of the disease to mother and fetus (CDC, 2011b).

CDC guidelines for vaccine administration are highlighted in **Box 12.5**.

BOX 12.5: CDC GUIDELINES FOR VACCINE ADMINISTRATION DURING PREGNANCY

Vaccines That Should be Considered if Otherwise Indicated

- Hepatitis B
- Influenza (inactivated) injection
- Tetanus/diphtheria (Tdap)
- Meningococcal
- Rabies

Vaccines Contraindicated During Pregnancy

- Influenza (live, attenuated vaccine) nasal spray
- Measles
- Mumps
- Rubella
- Varicella

- BCG (tuberculosis)
- Meningococcal
- Typhoid

Adapted from Centers for Disease Control and Prevention. (2011b). *Immunizations for pregnant women*. Retrieved from **http://www.cdc.gov/vaccines/spec-grps/pregnant.html**; and March of Dimes. (2011f). *Vaccinations during pregnancy*. Retrieved from **http://www.marchofdimes.com/pregnancy/prenatalcare_vaccinations.html**.

It is best for pregnant women not to take any medications. At the very least, encourage them to discuss with the health care provider their current medications and any herbal remedies they take so that they can learn about any potential risks should they continue to take them during pregnancy. Generally, if the woman is taking medicine for seizures, high blood pressure, asthma, or depression, the benefits of continuing the medicine during pregnancy outweigh the risks to the fetus. The safety profile of some medications may change according to the gestational age of the fetus (Trupin, 2011).

The Food and Drug Administration (FDA) has developed a system of ranking drugs that appears on drug labels and package inserts. These risk categories are summarized in **Box 12.6**. Always advise women to check with the health care provider for guidance.

BOX 12.6: FDA PREGNANCY RISK CLASSIFICATION OF DRUGS

- *Category A:* These drugs have been tested and found safe during pregnancy. Examples: folic acid, vitamin B_6, and thyroid medicine.
- *Category B:* These drugs have been used frequently during pregnancy and do not appear to cause major birth defects or other fetal problems. Examples: antibiotics, acetaminophen (Tylenol), aspartame (artificial sweetener), famotidine (Pepcid), prednisone (cortisone), insulin, and ibuprofen. (Ibuprofen should not be used after 36 weeks of pregnancy to avoid increased blood loss during parturition and to avoid premature closure of the ductus arterious in the fetus.)
- *Category C:* These drugs are more likely to cause problems and safety studies have not been completed. Examples: prochlorperazine (Compazine), fluconazole (Diflucan), ciprofloxacin (Cipro), and some antidepressants.
- *Category D:* These drugs have clear health risks for the fetus. Examples: alcohol, lithium (treats bipolar disorders), phenytoin (Dilantin); all chemotherapeutic agents used to treat cancer.
- *Category X:* These drugs have demonstrated positive evidence of fetal abnormalities and are contraindicated in women who are or may become pregnant. Examples: Accutane (treats cystic acne), androgens (treat endometriosis), Coumadin (prevents blood clots), antithyroid medications for overactive thyroid; radiation therapy (cancer treatment), Tegison or Soriatane (treats psoriasis), streptomycin (treats tuberculosis); thalidomide

(treats insomnia), diethylstilbestrol (DES) (treats menstrual disorders), and organic mercury from contaminated food.

Adapted from King, T. L., & Brucker, M. C. (2011). *Pharmacology for women's health*. Sudbury, MA: Jones & Bartlett; and Trupin, S. R. (2011). Common pregnancy complaints and questions. *eMedicine*. Retrieved from **http://emedicine.medscape.com/article/259724-overview**.

A common concern of many pregnant women involves the use of over-the-counter medications and herbal agents. Many women consider these products benign simply because they are available without a prescription (King & Brucker, 2011). Although herbal medications are commonly thought of as "natural" alternatives to other medicines, they can be just as potent as some prescription medications. A major concern about herbal medicine is the lack of consistent potency in the active ingredients in any given batch of product, making it difficult to know the exact strength by reading the label. Also, many herbs contain chemicals that cross the placenta and may cause harm to the fetus.

Nurses are often asked about the safety of over-the-counter medicines and herbal agents. Unfortunately, many drugs have not been evaluated in controlled studies, and it is difficult to make general recommendations for these products. Therefore, encourage pregnant women to check with their health care provider before taking anything. Questions about the use of over-the-counter and herbal products are part of the initial prenatal interview.

NURSING MANAGEMENT TO PREPARE THE WOMAN AND HER PARTNER FOR LABOR, BIRTH, AND PARENTHOOD

Childbirth today is a very different experience from childbirth in previous generations. In the past, women were literally "put to sleep" with anesthetics, and they woke up with a baby. Most women never remembered the details and had a passive role in childbirth as the physician delivered the newborn. In the 1950s, consumers began to insist on taking a more active role in their health care, and couples desired to be together during the extraordinary event of childbirth. Beginning in the 1970s, the father or significant other support person remained with the mother throughout labor and birth. Fathers today want to be seen as individuals who are part of the laboring couple. If fathers are left out, they tend to feel helpless; this can result in a feeling of panic and can put their support for their partner at risk (Carty, 2011).

Childbirth education began because women demanded to become more involved in their birthing experience rather than simply turning control over to a health care provider. Nurses played a pivotal role in bringing about this change by providing information and supporting clients and their families, fostering a more active role in preparing for the upcoming birth.

Traditional childbirth education classes focused on developing and practicing techniques for use in managing pain and facilitating the progress of labor. Recently, the focus of this education has broadened: it now encompasses not only preparation for childbirth, but also

preparation for breast-feeding, infant care, transition to new parenting roles, relationship skills, family health promotion, and sexuality (Kennedy, 2011). The term used to describe this broad range of topics is **perinatal education**. Subjects commonly addressed in perinatal education include:

- Anatomy and physiology of reproduction
- Fetal growth and development
- Prenatal maternal exercise
- Physiologic and emotional changes during pregnancy
- Sex during pregnancy
- Infant growth and development
- Nutrition and healthy eating habits during pregnancy
- Teratogens and their impact on the fetus
- Signs and symptoms of labor
- Preparation for labor and birth (for parents, siblings, and other family members)
- Options for birth
- Infant nutrition, including preparation for breast-feeding
- Infant care, including safety, CPR, and first aid
- Family planning (March of Dimes, 2011b)

Childbirth Education Classes

Childbirth education classes teach pregnant women and their support person about pregnancy, birth, and parenting. The classes are offered in local communities or online and are usually taught by certified childbirth educators.

Most childbirth classes support the concept of **natural childbirth** (a birth without pain-relieving medications) so that the woman can be in control throughout the experience as much as possible. The classes differ in their approach to specific comfort techniques and breathing patterns. The three most common childbirth methods are the Lamaze (psychoprophylactic) method, the Bradley (partner-coached childbirth) method, and the Dick-Read (natural childbirth) method.

Lamaze Method

Lamaze is a psychoprophylactic ("mind prevention") method of preparing for labor and birth that promotes the use of specific breathing and relaxation techniques. Dr. Fernand Lamaze, a French obstetrician, popularized this method of childbirth preparation in the 1960s. Lamaze believed that conquering fear through knowledge and support was important. He also believed women needed to alter the perception of suffering during childbirth. This perception change would come about by learning conditioned reflexes that, instead of signaling pain, would signal the work of producing a child, and thus would carry the woman through labor awake, aware, and in control of her own body (Lamaze International, 2012). Lamaze felt strongly that all women have the right to deliver their babies with minimal or no medication while maintaining their dignity, minimizing their pain, maximizing their self-esteem, and enjoying the miracle of birth.

Lamaze classes include information on toning exercises, relaxation exercises and techniques, and breathing methods for labor. The breathing techniques are used in labor to enhance relaxation and to reduce the woman's perception of pain. The goal is for women to become aware of their own comfortable rate of breathing in order to maintain relaxation and adequate oxygenation of the fetus. Breathing techniques are an effective attention-focusing strategy to reduce pain.

Paced breathing involves breathing techniques used to decrease stress responses and therefore decrease pain. This type of breathing implies self-regulation by the woman. The woman starts off by taking a cleansing breath at the onset and end of each contraction. This cleansing breath symbolizes freeing her mind from worries and concerns. This breath enhances oxygenation and puts the woman in a relaxed state.

Slow-paced breathing is associated with relaxation and should be half the normal breathing rate (six to nine breaths per minute). This type of breathing is the most relaxed pattern and is recommended throughout labor. Abdominal or chest breathing may be used. It is generally best to breathe in through the nose and breathe out either through the nose or mouth, whichever is more comfortable for the woman.

Modified-paced breathing can be used for increased work or stress during labor to increase alertness or focus attention or when slow-paced breathing is no longer effective in keeping the woman relaxed. The woman's respiratory rate increases, but it does not exceed twice her normal rate. Modified-paced breathing is a quiet upper chest breath that is increased or decreased according to the intensity of the contraction. The inhalation and the exhalation are equal. This breathing technique should be practiced during pregnancy for optimal use during labor.

Patterned-paced breathing is similar to modified-paced breathing but with a rhythmic pattern. It uses a variety of patterns, with an emphasis on the exhalation breath at regular intervals. Different patterns can be used, such as 4/1, 6/1, 4/1. A 4/1 rhythm is four upper chest breaths followed by an exhalation (a sighing out of air, like blowing out a candle). Random patterns can be chosen for use as long as the basic principles of rate and relaxation are met.

Couples practice these breathing patterns typically during the last few months of the pregnancy until they feel comfortable using them. Focal points (visual fixation on a designated object), effleurage (light abdominal massage), massage, and imagery (journey of the mind to a relaxing place) are also added to aid in relaxation. From the nurse's perspective, encourage the woman to breathe at a level of comfort that allows her to cope. Always remain quiet during the woman's periods of imagery and focal point visualization to avoid breaking her concentration.

Bradley (Partner-Coached) Method

The Bradley method uses various exercises and slow, controlled abdominal breathing to accomplish relaxation. Dr. Robert Bradley, a Denver-based obstetrician, advocated a completely unmedicated labor and birth experience. The Bradley method emphasizes the pleasurable sensations of childbirth, teaching women to concentrate on these sensations while "turning on" to their own bodies (Bradley Method, 2012). In 1965, Bradley

wrote *Husband-Coached Childbirth*, which advocated the active participation of the husband as labor coach.

A woman is conditioned to work in harmony with her body using breath control and deep abdominopelvic breathing to promote general body relaxation during labor. This method stresses that childbirth is a joyful, natural process and emphasizes the partner's involvement during pregnancy, labor, birth, and the early newborn period. Thus, the training techniques are directed toward the coach, not the mother. The coach is educated in massage/comfort techniques to use on the mother throughout the labor and birth process.

Dick-Read Method

In 1944 Grantly Dick-Read, a British obstetrician, wrote *Childbirth Without Fear*. He believed that the attitude of a woman toward her birthing process had a considerable influence on the ease of her labor, and he believed that fear is the primary pain-producing agent in an otherwise normal labor. He felt that fear builds a state of tension, creating an antagonistic effect on the laboring muscles of the uterus, which results in pain. Pain causes more fear, which further increases the tension, and the vicious cycle of "fear–tension–pain" is established (Higson, 2010). Dick-Read sought to interrupt the circular pattern of fear, tension, and pain during the labor and birthing process. He promoted the belief that the degree of fear could be diminished with increased understanding of the normal physiologic response to labor (Alexander et al., 2010).

Dick-Read believed that prenatal instruction was essential for pain relief and that emotional factors during labor interfered with the normal labor progression. The woman achieves relaxation and reduces pain by arming herself with the knowledge of normal childbirth and using abdominal breathing during contractions.

Nursing Management and Childbirth Education

Childbirth education is less about methods than about mastery. The overall aim of any of the methods is to promote an internal locus of control that will enable each woman to yield her body to the process of birth. As the woman gains success and tangible benefits from the exercises she is taught, she begins to reframe her beliefs and gains practical knowledge, and the impetus will be there for her to engage in the conscious use of the techniques (**Fig. 12.13**). Nurses play a key role in supporting and encouraging each couple's use of the techniques taught in childbirth education classes.

FIGURE 12.13

A couple practicing the techniques taught in a childbirth education class.

Every woman's labor is unique, and it is important for nurses not to generalize or stereotype women. The most effective support a nurse can offer a couple using prepared childbirth methods is encouragement and presence. These nursing measures must be adapted to each individual throughout the labor process. Offering encouraging phrases such as "great job" or "you can do it" helps to reinforce their efforts and at the same time empowers them to continue. Using eye-to-eye contact to engage the woman's total attention is important if she appears overwhelmed or appears to lose control during the transition phase of labor.

Nurses play a significant role in enhancing the couple's relationship by respecting the involvement of the partner and demonstrating concern for his needs throughout labor. Offering to stay with the woman to give him a break periodically allows him to meet his needs while at the same time still actively participating. Offer anticipatory guidance to the couple and assist during critical times in labor. Demonstrate many of the coping techniques to the partner and praise their successful use, which increases self-esteem. Focus on their strengths and the positive elements of the labor experience. Congratulating the couple for a job well done is paramount.

Throughout the labor experience, demonstrate personal warmth and project a friendly attitude. Frequently, a nurse's touch may help to prevent a crisis by reassuring the mother that she is doing fine.

Options for Birth Settings and Care Providers

From the moment a woman discovers she is pregnant, numerous decisions await her—where the infant will be born, what birth setting is best, and who will assist with the birth. The great majority of women are well and healthy and can consider the full range of birth settings—hospital, birth center, or home setting—and care providers. They should be given information about each to ensure the most informed decision.

Birth Settings

Hospitals are the most common site for birth in the United States. If the woman has a serious medical condition or is at high risk for developing one, she will probably need to plan to give birth in a hospital setting under the care of an obstetrician. Giving birth in a hospital is advantageous for several reasons. Hospitals are best equipped to diagnose and treat women and newborns with complications; trained personnel are available if necessary; and no transportation is needed if a complication should arise during labor or birth. Disadvantages include the high-tech atmosphere; strict policies and restrictions that might limit who can be with the woman; and the medical model of care.

Within the hospital setting, however, choices do exist regarding birth environments. The conventional delivery room resembles an operating room, where the health care professional delivers the newborn from the woman, who is positioned in stirrups. The woman is then transferred to the recovery area on a stretcher and then again to the postpartum unit. The birthing suite is the other option within the hospital setting. In the birthing suite, the woman and her partner remain in one place for labor, birth, and recovery. The birthing suite is a private room decorated to look as homelike as possible. For example, the bed converts to allow for various birthing positions, and there may be a rocking chair or an easy chair for the woman's partner. Despite the homey atmosphere, the room is still equipped with emergency resuscitative obstetric equipment and electronic fetal monitors in case they are needed quickly (Fig. 12.14A). Such settings provide a more personal childbirth experience in a less formal and intimidating atmosphere compared to the traditional delivery room.

FIGURE 12.14

(**A**) Birthing suite in hospital setting. (**B**) Childbirth room in Birthing Center.

A freestanding birth center (Fig. 12.14B) can be a good choice for a woman who wants more personalized care than in a hospital but does not feel comfortable with a home birth. In contrast to the institutional environment in hospitals, most freestanding birth centers have a homelike atmosphere, and many are, in fact, located in converted homes. Some are located on hospital property and are affiliated with them. Birth centers are designed to provide maternity care to women judged to be at low risk for obstetric complications. Women are allowed and encouraged to give birth in the position most comfortable for them. Care in birth centers is often provided by midwives and is more relaxed, with no routine intravenous lines, fetal monitoring, and restrictive protocols. A disadvantage of the birth center is the need to transport the woman to a hospital quickly if an emergency arises, because emergency

equipment is not readily available. In a research study comparing homelike to conventional institutional settings, the author concluded that there appeared to be some benefits from homelike settings for childbirth, although increased support from caregivers may be more important (Rogers, Pickersgill, Palmer, & Broadbent, 2010).

Rates of planned home births have remained at less than 1% for several decades, but current public discourse suggests that women are increasingly interested in this option. Most women who choose a home birth believe that birth is a natural process that requires little medical intervention (Wax, Pinette, Cartin, & Blackstone, 2010). Research has shown that women believe that planned home births increase privacy, comfort, and convenience; are associated with reduced rates of medical interventions; and facilitate family involvement in a relaxed, peaceful atmosphere (Vedam, Janssen, & Lichtman, 2010).

Home births can be safe if there are qualified, experienced attendants and an emergency transfer system in place in case of serious complications. Many women choose the home setting out of a strong desire to control their child's birth and to give birth surrounded by family members. Most home birth caregivers are midwives who have provided continuous care to the woman throughout the pregnancy. Disadvantages include the need to transport the woman to the hospital during or after labor if a problem arises, and the limited pain management available in the home setting.

Care Providers

While most women in the United States still receive pregnancy care from an obstetrician, an increasing number are choosing a midwife for their care. The difference is a matter of degrees. Obstetricians must finish a 4-year residency in obstetrics and gynecology in addition to medical school. Certified nurse-midwives are registered nurses who have graduated from a nurse-midwifery education program accredited by the Accreditation Commission for Midwifery Education (ACME) and have passed a national certification examination to receive the professional designation of certified nurse-midwife. Midwives usually care for low-risk women in a variety of settings. They are able to write prescriptions, provide prenatal care, childbirth care, postpartum care, newborn care, and well women's care throughout the lifespan. Family practice doctors also provide maternity, woman's care, and well-baby care. Many deliver their clients' newborns in the hospital or birthing centers. Obstetricians can handle high-risk pregnancies and delivery emergencies; can administer or order pain-relief drugs; and are assisted by a support staff in the hospital setting. Midwives work in hospitals, birthing centers, and home settings to deliver care. They believe in the normalcy of birth and tolerate wide variations of what is considered normal during labor, which leads to fewer interventions applied during the childbirth process (Stelfox, 2010). Midwives do handle high risk and emergency births because many are not always predictable—they typically have an obstetrician as back up when they do occur to assist them.

In addition to the woman's primary health care professional, some women hire a doula to be with them during the childbearing process. *Doula* is a Greek word that means "woman's servant." A doula is a laywoman trained to provide women and their families with encouragement, emotional and physical support, and information through late pregnancy, labor, birth, and postpartum. Doulas provide the woman with continuous support throughout labor but do not perform any clinical procedures.

Preparation for Breast-Feeding or Bottle-Feeding

Pregnant women are faced with a decision about which method of feeding to choose. Educate the pregnant client about the advantages and disadvantages of each method, allowing the woman and her partner to make an informed decision about the best method for their situation. Providing the client and her partner with this information will increase the likelihood of a successful experience regardless of the method of feeding chosen.

Breast-Feeding

Substantial scientific evidence exists documenting the health benefits of breast-feeding for newborns. Recent systematic reviews of studies showed improved outcomes for breast-fed infants with regard to otitis media, lower respiratory infections, gastroenteritis, atopic dermatitis, childhood asthma, obesity, type 1 and type 2 diabetes, childhood leukemia, sudden infant death syndrome, and cognitive development and for their mothers with regard to breast cancer, ovarian cancer, and type 2 diabetes (Brodribb, 2011). In addition, a lack of breast-feeding has a negative impact on the health care system by increasing the number of client visits, hospital admissions, and health care costs. A recent study estimates that $10.5 billion a year would be saved and 741 deaths prevented each year if 80% of infants in the United States were exclusively breast-fed until 6 months (Brodribb, 2011).

Human milk provides an ideal balance of nutrients for newborns (ACOG, 2011a). Breast-feeding is advantageous for the following reasons:

- Human milk is digestible and economical and requires no preparation.
- Bonding between mother and child is promoted.
- Cost is less than purchasing formula.
- Ovulation is suppressed (however, this is not a reliable birth control method).
- The risk of ovarian cancer and the incidence of premenopausal breast cancer are reduced for the woman.
- Extra calories are used, which promotes weight loss gradually without dieting.
- Oxytocin is released to promote more rapid uterine involution with less bleeding.
- Sucking helps to develop the muscles in the infant's jaw.
- Absorption of lactose and minerals in the newborn is improved.
- The immunologic properties of breast milk help prevent infections in the baby.
- The composition of breast milk adapts to meet the infant's changing needs.
- Constipation in the baby is not a problem with adequate intake.
- Food allergies are less likely to develop in the breast-fed baby.
- The incidence of otitis media and upper respiratory infections in the infant is reduced.
- Breast-fed babies are less likely to be overfed, thus reducing the risk of adult obesity.
- Breast-fed newborns are less prone to vomiting (ACOG, American Academy of Pediatrics, American Academy of Family Physicians, & Women, Infant & Children, 2010).

One could say that lactation and breast-feeding are so natural that they should just happen on their own accord, but this is not the case. Learning to breast-feed takes practice, requires support from the

partner, and requires dedication and patience on the part of the mother; it may be necessary to work closely with a lactation consultant to be successful and comfortable when breast-feeding.

Breast-feeding also has disadvantages. These include breast discomfort, sore nipples, mastitis, engorgement, milk stasis, vaginal dryness, and decreased libido (Ripton, 2011). The most common cause of nipple pain is an improper latch and such discomfort is piercing, immediate and short lived, typically occurring as soon as the baby starts nursing and gradually subsiding during the feeding. Some mothers feel it is inconvenient or embarrassing, limits other activities, limits partner involvement, increases their dependency by being tied to the infant all the time, and restricts their use of alcohol or drugs. Nurses can help mothers to cope with their fear of dependency and feelings of obligation by emphasizing the positive aspects of breast-feeding and encouraging bonding experiences.

Nipple preparation is not necessary during the prenatal period unless the nipples are inverted and do not become erect when stimulated. Assess for this by placing the forefinger and thumb above and below the areola and compressing behind the nipple. If it flattens or inverts, advise the client to wear breast shields during the last 2 months of pregnancy. Breast shields exert a continuous pressure around the areola, pushing the nipple through a central opening in the inner shield (La Leche League International, 2011). The shields are worn inside the bra. Initially the shields are worn for 1 hour, and then the woman progressively increases the wearing time up to 8 hours daily. The client maintains this schedule until after childbirth, and then she wears the shield 24 hours a day until the infant latches on easily (La Leche League International, 2011). In addition, suggest that the woman wear a supportive nursing bra 24 hours a day.

Encourage the woman to attend a breast-feeding support group (e.g., La Leche League), provide her with sources of information about infant feeding, and suggest that she read a good reference book about lactation. All of these activities will help in her decision-making process and will be invaluable to her should she choose to breast-feed her newborn.

Bottle-Feeding

Bottle-feeding an infant is not just a matter of "open, pour, and feed." Parents need information on types of formulas, preparation and storage of formula, equipment, and feeding positions. It is recommended that normal full-term infants receive conventional cow's milk-based formula; the physician should direct this choice. If the infant has a reaction (diarrhea, vomiting, abdominal pain, excessive gas) to the first formula, another formula should be tried. Sometimes a soy-based formula is substituted. In terms of preparation of formula and its use, the following guidelines should be stressed:

- Obtain adequate equipment (six 4-ounce bottles, eight 8-ounce bottles, and nipples).
- Consistency is important. Stay with a nipple that is comfortable to the infant.
- Frequently assess nipples for any loose pieces of rubber at the opening.
- Correct formula preparation is critical to the health and development of the infant. Formula is available in three forms: ready-to-feed, concentrate, and powder.
- Read the formula label thoroughly before mixing.

- Correct formula dilution is important to avoid fluid imbalances. For ready-to-use formula, use as is without dilution. For concentrated formulas, dilute with equal parts of water. For powdered formulas, mix one scoop of powder with 2 ounces of water.
- If the water supply is safe, sterilization is not necessary.
- Bottles and nipples should be washed in hot, sudsy water using a bottle brush.
- Formula should be served at room temperature.
- If the water supply is questionable, water should be boiled for 5 minutes before use.
- Formula should not be heated in a microwave oven, because it is heated unevenly.
- Formula can be prepared 24 hours ahead of time and stored in the refrigerator.

Teach the woman and other caretakers to feed the infant in a semi-upright position using the cradle hold in the arms. This position allows for face-to-face contact between the infant and caretaker. Advise the caretaker to hold the bottle so that the nipple is kept full of formula to prevent excessive air swallowing. Instruct the caretaker to feed the infant every 3 to 4 hours and adapt the feeding times to the infant's needs. Frequent burping of the infant (every ounce) helps prevent gas from building up in the stomach. Caution the caretaker not to prop the bottle; propping the bottle can cause choking.

Recent research indicates that infants who are fed formula within the first 6 months do have an increased incidence of otitis media, diabetes, asthma, atopic dermatitis, and lower respiratory infections (McNiel, Labbok, & Abrahams, 2010). It is important to inform mothers and their partners of this.

Bottle-feeding should mirror breast-feeding as closely as possible. While nutrition is important, so are the emotional and interactive components of feeding. Encourage the caretaker to cuddle the infant closely and position the infant so that his or her head is in a comfortable position. Also encourage communication with the infant during feedings.

Final Preparation for Labor and Birth

The nurse has played a supportive/education role for the couple throughout the pregnancy and now needs to assist in preparing them for their "big event" by making sure they have made informed decisions and completed the following checklist:

- Attended childbirth preparation classes and practiced breathing techniques
- Selected a birth setting and made arrangements there
- Know what to expect during labor and birth
- Toured the birthing facility
- Packed a suitcase to take to the birthing facility when labor starts
- Made arrangements to have siblings and/or pets taken care of during labor
- Been instructed on signs and symptoms of labor and what to do
- Know what to do if membranes rupture prior to going into labor
- Know how to reach their health care professional when labor starts
- Communicated their needs and desires concerning pain management
- Discussed the possibility of a cesarean birth if complications occur
- Discussed possible names for the newborn
- Selected a feeding method (bottle or breast) with which they feel comfortable

- Made a decision regarding circumcision if they have a boy
- Purchased an infant safety car seat in which to bring their newborn home
- Decided on a pediatrician
- Have items needed to prepare for the newborn's homecoming:
  - Infant clothes in several sizes
  - Nursing bras
  - Infant crib with spaces between the slats that are 2? inches or less apart
  - Diapers (cloth or disposable)
  - Feeding supplies (bottles and nipples if bottle-feeding)
  - Infant thermometer
- Selected a family planning method to use after the birth

At each prenatal visit the nurse has had the opportunity to discuss and reinforce the importance of being prepared for the birth of the child with the parents. It is now up to the parents to use the nurse's guidance and put it into action to be ready for their upcoming "big event."

All nurses have the responsibility to impart our knowledge to all women and their families—and that starts with teaching ourselves first. The evidence is clear that women have better outcomes when we intervene only when needed in the childbirth process. We need to personalize our care to every woman based on her needs, her desires, and her state of health. We must focus on teaching women and their families to understand the value of birth and its long-lasting effects on the family. In addition, nurses must provide birth settings that are safe, whether in the hospital, birth center, or at home. This includes, but is not limited to, providing continuous support in labor, allowing women the freedom to move and assume positions of choice, offering nourishment of the woman's body and spirit, using nonpharmacologic pain relief modalities whenever possible, and ensuring seamless, collaborative teamwork (Kennedy, 2011).

KEY CONCEPTS

- Preconception care is the promotion of the health and well-being of a woman and her partner before pregnancy. The goal of preconception care is to identify any areas such as health problems, lifestyle habits, or social concerns that might unfavorably affect pregnancy.
- A thorough history and physical examination are performed on the initial prenatal visit.
- A primary aspect of nursing management during the antepartum period is counseling and educating the pregnant women and her partner to promote healthy outcomes for all involved.
- Nagele's rule can be used to establish the estimated date of birth. Using this rule, Subtract 3 months from the month of their last LMP, add 7 days to the first day of the last normal menstrual period, then correct the year by adding 1 to it. This date is within plus or minus 2 weeks (margin of error).
- Pelvic shape is typically classified as one of four types: gynecoid, android, anthropoid, and platypelloid. The gynecoid type is the typical female pelvis and offers the best shape for a vaginal delivery.

- Continuous prenatal care is important for a successful outcome. The recommended schedule is every 4 weeks up to 28 weeks (7 months); every 2 weeks from 29 to 36 weeks; and every week from 37 weeks to birth.
- The height of the fundus is measured when the uterus arises out of the pelvis to evaluate fetal growth.
- The fundus reaches the level of the umbilicus at approximately 20 weeks and measures 20 cm. The fundal measurement should approximately equal the number of weeks of gestation until week 36.
- At each visit the woman is asked whether she is having any common signs or symptoms of preterm labor, which might include uterine contractions, dull backache, pressure in the pelvic area or thighs, increased vaginal discharge, menstrual-like cramps, and vaginal bleeding.
- Prenatal screening has become standard in prenatal care to detect neural tube defects and genetic abnormalities.
- The nurse should address matter of factly common discomforts that occur in each trimester at all prenatal visits and should provide realistic measures to help the client deal with them effectively.
- The pregnant client can better care for herself and the fetus if her concerns are anticipated by the nurse and incorporated into guidance sessions at each prenatal visit.
- Iron and folic acid need to be supplemented because their increased requirements during pregnancy are usually too great to be met through diet alone.
- Throughout pregnancy, a well-balanced diet is critical for a healthy baby.
- Perinatal education has broadened its focus to include preparation for pregnancy and family adaptation to the new parenting roles. Childbirth education began because of increasing pressure from consumers who wanted to become more involved in their birthing experience.
- Three common childbirth education methods are Lamaze (psychoprophylactic), Bradley (partner-coached childbirth), and Dick-Read (natural childbirth).
- The great majority of women in the United States are well and healthy and can consider the full range of birth settings: hospital, birth center, or home setting.
- All pregnant women need to be able to recognize early signs of contractions to prevent preterm labor.