

ESSENTIALS of Maternity, Newborn, & Women's Health

Nursing - **THIRD EDITION** Susan Scott Ricci, ARNP, MSN, MEd

20: Nursing Management of the Pregnancy at Risk: Selected Health Conditions and Vulnerable Populations

Learning Objectives

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

- **1.** Select at least two conditions present before pregnancy that can have a negative effect on a pregnancy.
- **2.** Examine how a condition present before pregnancy can affect the woman physiologically and psychologically when she becomes pregnant.
- **3.** Evaluate the nursing assessment and management for a pregnant woman with diabetes from that of a pregnant woman without diabetes.
- **4.** Explore how congenital and acquired heart conditions can affect a woman's pregnancy.
- **5.** Design the nursing assessment and management of a pregnant woman with cardiovascular disorders and respiratory conditions.
- **6.** Differentiate among the types of anemia affecting pregnant women in terms of prevention and management.
- **7.** Relate the nursing care needed for the pregnant woman with an autoimmune disorder.
- **8.** Compare the most common infections that can jeopardize a pregnancy, and propose possible preventive strategies.
- **9.** Develop a plan of care for the pregnant woman who is HIV positive.
- **10.** Outline the nurse's role in the prevention and management of adolescent pregnancy.
- **11.** Determine the impact of pregnancy on a woman over the age of 35.
- **12.** Analyze the effects of substance abuse during pregnancy.

KEY TERMS

acquired immunodeficiency syndrome (AIDS)

adolescence

anemia

fetal alcohol spectrum disorder (FASD)

gestational diabetes mellitus

glycosylated hemoglobin (HbA1C) level

human immunodeficiency virus (HIV)

impaired fasting glucose

impaired glucose tolerance

multiple sclerosis (MS)

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neonatal abstinence syndrome

perinatal drug abuse

pica

pregestational diabetes

rheumatoid arthritis (RA)

systemic lupus erythematosus (SLE)

teratogen

type 1 diabetes

type 2 diabetes

Rose, a thin 16-year-old appearing very pregnant, came into the clinic wheezing and having difficulty catching her breath. She had missed several previous prenatal visits but arrived at the clinic today in distress. Rose has a history of asthma since she was 5 years old. How might Rose's current condition affect her pregnancy? Is this picture typical of the pregnant woman with asthma?

WOW: *Words of Wisdom*

As the sun sets each day, nurses should make sure they have done something for others, and should try to be understanding even under the most difficult of conditions.

Pregnancy and childbirth are exciting yet complex facets within the continuum of women's health. Ideally the pregnant woman is free of any conditions that can affect a pregnancy, but in reality many women enter pregnancy with a multitude of health-related or psychosocial issues that can have a negative impact on the outcome.

Many pregnant women express the wish "I hope my baby is born healthy." Nurses can play a major role in helping this become a reality by educating women before they become pregnant. Conditions such as diabetes, cardiac and respiratory disorders, anemia, autoimmune disorders, and specific infections frequently can be controlled through close prenatal management so that their impact on pregnancy is minimized. Nurses can provide pregnancy prevention strategies when counseling teenagers. Meeting the developmental needs of pregnant adolescents is a challenge. Finally, lifestyle choices can place many women at risk during pregnancy, and nurses need to remain nonjudgmental when working with these special populations. Lifestyle choices such as use of alcohol, nicotine, and illicit substances during pregnancy are addressed in a *Healthy People 2020* goal.

Chapter 19 described pregnancy-related conditions that place the woman at risk. This chapter addresses common conditions that can have a negative impact on the pregnancy and special populations at risk, outlining appropriate nursing assessment and management for each condition or situation. The unique skills of nurses, in conjunction with the other

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members of the health care team, can increase the potential for a positive outcome in many high-risk pregnancies.

DIABETES MELLITUS

Diabetes mellitus is a chronic disease characterized by a relative lack of insulin or absence of the hormone that is necessary for glucose metabolism. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of the eyes, kidneys, nerves, heart, and blood vessels. The prevalence of diabetes in the United States is increasing at an alarming rate, already reaching epidemic proportions. Contributing factors to these increasing rates are more sedentary lifestyles, dietary changes, continued immigration by high-risk populations, and the epidemic of childhood and adolescent obesity that is presently evolving in our nation. Currently, an estimated 20% of people over the age of 20 have undiagnosed prediabetes. This group of people is the pool from which childbearing women are drawn (Stokowski, 2010).

Diabetes commonly is classified based on disease etiology (American Diabetes Association [ADA], 2012a). These groups include:

- **Type 1 diabetes:** absolute insulin deficiency (due to an autoimmune process); usually appears before the age of 30 years; approximately 10% of those diagnosed have type 1 diabetes.
- **Type 2 diabetes:** insulin resistance or deficiency (related to obesity, sedentary lifestyle); diagnosed primarily in adults older than 30 years of age but is now being seen in children; accounts for 90% of all diagnosed cases.
- **Impaired fasting glucose and impaired glucose tolerance:** characterized by hyperglycemia at a level lower than what qualifies as a diagnosis of diabetes (fasting blood glucose level between 100 and 125 mg/dL; blood glucose level between 140 and 199 mg/dL after a 2-hour glucose tolerance test, respectively); symptoms of diabetes are absent; newborns are at risk for being large for gestational age (LGA).
- **Gestational diabetes mellitus:** glucose intolerance with its onset during pregnancy or first detected in pregnancy.

During pregnancy, diabetes typically is categorized into two groups: **pregestational diabetes** (alteration in carbohydrate metabolism identified before conception), which includes women with type 1 or type 2 disease; and gestational diabetes, which develops during pregnancy.

The International Association of Diabetes and Pregnancy Study Group has issued new recommendations for diagnosing and classifying hyperglycemia in pregnancy (see [Table 20.1](#)).

TABLE 20.1: RECOMMENDATIONS FOR DIAGNOSING AND CLASSIFYING HYPERGLYCEMIA IN PREGNANCY

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When	Diagnosis	Test	Cutoff for Diagnosis
First prenatal visit	Overt (pregestational) diabetes	Fasting	126 mg/dL
		HbA1C	<7%
		Random	200 mg/dL
24–28 weeks	Gestational diabetes	Fasting	92 mg/dL
		75 g OGTT–1 hr	180 mg/dL
		75 g OGTT–2 hr	153 mg/dL

OGTT = oral glucose tolerance test.

Adapted from International Association of Diabetes and Pregnancy Study Group. (2012). Screening for gestational diabetes mellitus. *Diabetes Care*, 35(2). Retrieved from <http://care.diabetesjournals.org/content/early/2012/01/23/dc11-1643>; Kendrick, J. (2011). Screening and diagnosing gestational diabetes mellitus revisited: Implications from HAPO. *Journal of Perinatal & Neonatal Nursing*, 25(3), 226–232; and Moore, T. R. (2012). Diabetes mellitus and pregnancy. *eMedicine*. Retrieved from <http://emedicine.medscape.com/article/127547>.

Gestational diabetes is associated with either neonatal complications such as macrosomia, hypoglycemia, and birth trauma or maternal complications such as preeclampsia and cesarean birth. Gestational diabetes affects about 18% of all pregnant women (ADA, 2012e).

20-1: HEALTHY PEOPLE 2020

Objective	Nursing Significance
Increase abstinence from alcohol, cigarettes, and illicit drugs among pregnant women	Will help to focus attention on measures for reducing substance exposure and use, thereby minimizing the effects of these substances on the fetus and newborn
Increase in reported abstinence in the past month from substances by pregnant women	
Alcohol from a baseline of 89.4% to 98.3%	

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Objective	Nursing Significance
Binge drinking from a baseline of 95% to 100% Cigarette smoking from a baseline of 89.6% to 98.6% Illicit drugs from a baseline of 94.9% to 100%	

Healthy People objectives based on data from <http://www.healthypeople.gov>.

Before the discovery of insulin in 1922, most women with diabetes were infertile or experienced spontaneous abortion (March of Dimes, 2012). During the past several decades, great strides have been made in improving the outcomes of pregnancy in women with diabetes, but this chronic metabolic disorder remains a high-risk condition during pregnancy. A favorable outcome requires commitment on the woman's part to comply with frequent prenatal visits, dietary restrictions, self-monitoring of blood glucose levels, frequent laboratory tests, intensive fetal surveillance, and perhaps hospitalization.

The prevalence of gestational diabetes is strongly related to the woman's race and culture. Prevalence rates are higher in African American, Hispanic, Native American, and Asian women than in Caucasian women (Moore, 2012).

Pathophysiology

Normal pregnancy is characterized by increasing peripheral resistance to insulin and a compensatory increase in insulin secretion. Therefore, pregnancy might be viewed as a stress test for the glucose homeostasis mechanisms. That is, women who have some degree of chronic insulin resistance and compensatory increased insulin production resulting in beta-cell dysfunction before pregnancy may be unable to mount a sufficiently robust beta-cell response to pregnancy-mediated insulin resistance.

With diabetes, there is a deficiency of or resistance to insulin. This alteration interferes with the body's ability to obtain essential nutrients for fuel and storage. If a pregnant woman has pregestational diabetes or develops gestational diabetes, the profound metabolic alterations that occur during pregnancy and that are necessary to support the growth and development of the fetus are greatly affected.

Maternal metabolism is directed toward supplying adequate nutrition for the fetus. In pregnancy, placental hormones cause insulin resistance at a level that tends to parallel the growth of the fetoplacental unit. As the placenta grows, more placental hormones are secreted. Human placental lactogen (hPL) and growth hormone (somatotropin) increase in direct correlation with the growth of placental tissue, rising throughout the last 20 weeks of pregnancy and causing insulin resistance. Subsequently, insulin secretion increases to overcome the resistance of these two hormones. In the pregnant woman without diabetes, the pancreas can respond to the demands for increased insulin production to maintain normal glucose levels throughout the pregnancy (Pridjian & Benjamin, 2010).

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However, the woman with glucose intolerance or diabetes during pregnancy cannot cope with changes in metabolism resulting from insufficient insulin to meet the needs during gestation.

Over the course of pregnancy, insulin resistance changes. It peaks in the last trimester to provide more nutrients to the fetus. The insulin resistance typically results in postprandial hyperglycemia, although some women also have an elevated fasting blood glucose level (Stuebe, McElrath, Thadhani, & Ecker, 2010). With this increased demand on the pancreas in late pregnancy, women with diabetes or glucose intolerance cannot accommodate the increased insulin demand; glucose levels rise as a result of insulin deficiency, leading to hyperglycemia. Subsequently, the mother and her fetus can experience major problems (Table 20.2).

TABLE 20.2: DIABETES AND PREGNANCY: EFFECTS ON THE MOTHER AND FETUS

Effects on the Mother	Effects on the Fetus/Neonate
<ul style="list-style-type: none"> • Hydramnios due to fetal diuresis caused by hyperglycemia • Gestational hypertension of unknown etiology • Ketoacidosis due to uncontrolled hyperglycemia • Preterm labor secondary to premature membrane rupture • Stillbirth in pregnancies complicated by ketoacidosis and poor glucose control • Hypoglycemia as glucose is diverted to the fetus (occurring in first trimester) • Urinary tract infections resulting from excess glucose in the urine (glucosuria), which promotes bacterial growth • Chronic monilial vaginitis due to glucosuria, which promotes growth of yeast • Difficult labor, cesarean birth, postpartum hemorrhage secondary to an overdistended uterus to accommodate a macrosomic infant 	<ul style="list-style-type: none"> • Cord prolapse secondary to hydramnios and abnormal fetal presentation • Congenital anomaly due to hyperglycemia in the first trimester (cardiac problems, neural tube defects, skeletal deformities, and genitourinary problems) • Macrosomia resulting from hyperinsulinemia stimulated by fetal hyperglycemia • Birth trauma due to increased size of fetus, which complicates the birthing process (shoulder dystocia) • Preterm birth secondary to hydramnios and an aging placenta, which places the fetus in jeopardy if the pregnancy continues • Fetal asphyxia secondary to fetal hyperglycemia and hyperinsulinemia • Intrauterine growth restriction secondary to maternal vascular impairment and decreased placental perfusion, which restricts growth • Perinatal death due to poor placental perfusion and hypoxia • Respiratory distress syndrome resulting from poor surfactant production secondary to hyperinsulinemia inhibiting the production of phospholipids, which make up surfactant • Polycythemia due to excessive red blood cell (RBC) production in response to hypoxia

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Effects on the Mother	Effects on the Fetus/Neonate
	<ul style="list-style-type: none">• Hyperbilirubinemia due to excessive RBC breakdown from hypoxia and an immature liver unable to break down bilirubin• Neonatal hypoglycemia resulting from ongoing hyperinsulinemia after the placenta is removed• Subsequent childhood obesity and carbohydrate intolerance
Adapted from Gilbert, E. S. (2011). <i>Manual of high risk pregnancy and delivery</i> (5th ed.). St. Louis, MO: Mosby Elsevier; and March of Dimes. (2012). <i>Diabetes in pregnancy</i> . Retrieved from http://marchofdimes.com/professionals/14332_1197.asp .	

Screening

The American College of Obstetricians and Gynecologists (ACOG) and ADA currently recommend a risk analysis of all pregnant women at their first prenatal visit and additional screening of all high-risk pregnant women again at 24 to 28 weeks, or earlier if risk factors are present. If the initial screening risk assessment is low, additional screening may not be necessary. Pregnant women who fulfill all of the following criteria need not be screened at their first prenatal visit:

- No history of glucose intolerance
- Less than 25 years old
- Normal body weight
- No family history (first-degree relative) of diabetes
- No history of poor obstetric outcome
- Not from an ethnic/racial group with a high prevalence of diabetes (ADA, 2012e)

If the initial risk assessment is high, rescreening should take place between 24 and 28 weeks. A woman with abnormal early results may have had diabetes before the pregnancy, and her fetus is at great risk for congenital anomalies. An elevated glycosylated hemoglobin supports the likelihood of gestational diabetes. Combining the use of HbA1c and plasma glucose measurements for the diagnosis of diabetes offers the benefits of each test and reduces the risk of systematic bias inherent in HbA1c testing alone (Balaji & Seshiah, 2011).

There is little consensus regarding the appropriate screening method. Typically, screening is based on a 75-g 1-hour glucose challenge test, usually performed between week 24 and 28 of gestation (ADA, 2012c). A 75-g oral glucose load is given, without regard to the timing or content of the last meal. Blood glucose is measured 1 hour later; a level above 140 mg/dL is abnormal. If the result is abnormal, a 3-hour glucose tolerance test is done. Normal values are:

- Fasting blood glucose level: less than 92 mg/dL
- At 1 hour: less than 180 mg/dL

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- At 2 hours: less than 153 mg/dL
- At 3 hours: less than 140 mg/dL

A diagnosis of gestational diabetes can be made only after an abnormal result is obtained on the glucose tolerance test. One or more abnormal values confirm a diagnosis of gestational diabetes (ADA, 2012e). A newer, more controlled screening is currently being considered for adoption by ADA and ACOG because of mounting evidence that diagnosing and treating even mild gestational diabetes reduces morbidity for both mother and infant (ADA, 2012c). If adopted, the new guidelines are expected to have immediate, widespread clinical implications.

Therapeutic Management

Preconception counseling is key for the woman with pregestational diabetes (the alteration in carbohydrate metabolism is identified before conception) to ensure that her disease state is stable. The problem though is that as many as half of all pregnancies in the United States are unplanned. Thus women with chronic medical conditions such as diabetes might not have the opportunity to take steps to optimize management of their diabetes before becoming pregnant. When preconception care is possible, women with pregestational diabetes should be taught how to improve their metabolic control prior to conception to reduce the risk of birth defects. Nurses caring for women of reproductive age can contribute to preconception care by helping to counsel someone who is prediabetic to avoid progression to diabetes and its attendant risks during pregnancy. The goals of preconception care are to:

- Integrate the woman into the management of her diabetes
- Achieve the lowest glycosylated hemoglobin A1C test results without excessive hypoglycemia
- Ensure effective contraception until stable glycemia is achieved
- Identify and evaluate long-term diabetic complications such as retinopathy, nephropathy, neuropathy, cardiovascular disease, and hypertension (ADA, 2012a)

Excellent control of blood glucose, as evidenced by normal fasting blood glucose levels and a **glycosylated hemoglobin (HbA1C) level** (a measurement of the average glucose levels during the past 100 to 120 days), is crucial to achieve the best pregnancy outcome. A glycosylated hemoglobin level of less than 7% indicates good control; a value of more than 8% indicates poor control and warrants intervention (ADA, 2012c).

Preconception counseling is also important in helping to reduce the risk of congenital malformation. The most common malformations associated with diabetes occur in the renal, cardiac, skeletal, and central nervous systems. Since these defects occur by the eighth week of gestation, preconception counseling is critical. The rate of congenital anomalies in women with pregestational diabetes can be reduced if excellent glycemic control is achieved at the time of conception (Moore, 2012). This information needs to be stressed with all women with diabetes who are contemplating a pregnancy.

In addition, the woman with pregestational diabetes needs to be evaluated for complications of diabetes. This evaluation should be part of baseline screening and continuing assessment during pregnancy.

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Therapeutic management for the woman with gestational diabetes mellitus (defined as glucose intolerance with its onset during pregnancy or first detected during pregnancy) focuses on tight glucose control. The ADA (2012e) recommends maintaining a fasting blood glucose level below 92 mg/dL, with postprandial levels below 180 mg/dL at 1-hour and 2-hour postprandial levels below 153 mg/dL. In comparison, for pregnant women without diabetes, near-normal glucose values include a fasting value between 60 and 90 mg/dL, a 1-hour postprandial value of 100 to 120 mg/dL, and a 2-hour postprandial value of 60 to 120 mg/dL. Such tight control has been advocated because it is associated with a reduction in macrosomia. In addition, maternal prepregnancy weight and weight gain during pregnancy appear to be significant and independent risk factors for macrosomia in women with gestational diabetes also (Ouzounian et al., 2011).

Women with diabetes need comprehensive prenatal care. The primary goals of care are to maintain glycemic control and minimize the risks of the disease on the fetus. Key aspects of treatment include nutritional management, exercise, insulin regimens, and close maternal and fetal surveillance ([Fig. 20.1](#)).

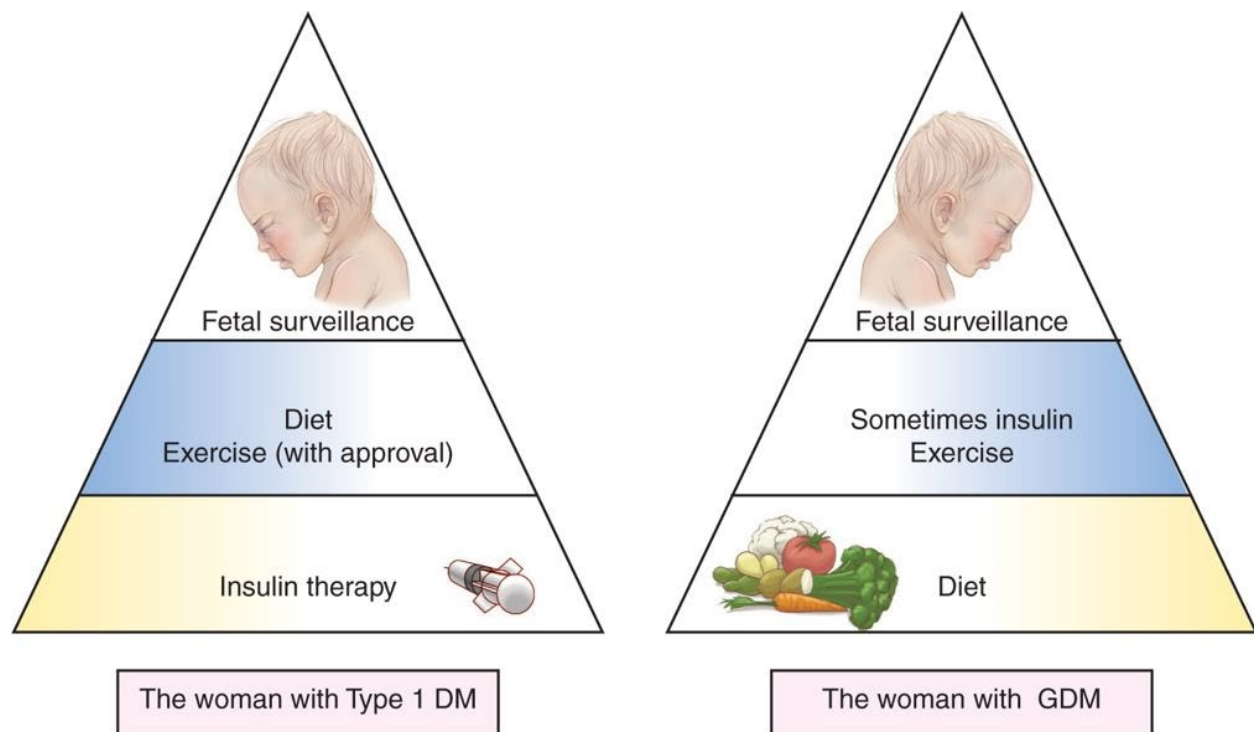


FIGURE 20.1

Treatment overview for diabetes in pregnancy. For women with pregestational type 1 DM, the foundation of glycemic management is insulin therapy along with dietary management, exercise, and fetal surveillance. For the woman who develops gestational diabetes, dietary modification is generally the foundation of treatment. Some women may require insulin along with dietary modifications, whereas others will not. Exercise and fetal surveillance are also important facets of care.

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Nutritional management focuses on maintaining balanced glucose levels and providing enough energy and nutrients for the pregnant woman, while avoiding ketosis, and minimizing the risk of hypoglycemia in women treated with insulin. Nutrition therapy is the cornerstone of therapy for women with gestational diabetes (Magon & Seshiah, 2011). Eating for two in pregnancy with diabetes means eating not volume for two, but rather quality and timing to support both mother and fetus. Women who receive dietary instruction and follow it have been shown to have a better pregnancy outcome than those who don't receive dietary advice (Lutz & Przytulski, 2011). For the woman with gestational diabetes, nutritional management and exercise may be all that is necessary. Pharmacologic therapy is considered if nutrition and exercise fail to maintain target glucose levels.

Insulin, which doesn't cross the placenta, historically has been the medication of choice for treating hyperglycemia in pregnancy. Insulin is calculated based on the woman's weight. Combining intermediate and short-acting insulin yields the best result for most women. Two insulin doses are given daily with two thirds of the total insulin in the morning to cover energy needs of the active day and one third at night (King & Brucker, 2011). Recent studies have examined the use of oral hypoglycemic medications in pregnancy with much success. Several studies have used glyburide (DiaBeta) with promising results. Many health care providers are using glyburide and metformin as an alternative to insulin therapy because they do not cross the placenta and therefore do not cause fetal/neonatal hypoglycemia. Some oral hypoglycemic medications are considered safe and may be used if nutrition and exercise are not adequate alone. Maternal and newborn outcomes are similar to those seen in women who are treated with insulin. Oral hypoglycemic agents, however, must be further investigated to determine their safety with confidence and provide better treatment options for diabetes in pregnancy. Currently, there is a growing acceptance of glyburide (glibenclamide) use as a primary therapy for gestational diabetes. Glyburide and metformin have also been found to be safe, effective, and economical for the treatment of gestational diabetes. Insulin, however, still has an important role to play in gestational diabetes (Moore, 2012). Gestational diabetes offers a window of opportunity, which needs to be seized, for prevention of diabetes in future life (Refuerzo, 2011).

The ADA (2012b) recommends that women diagnosed with gestational diabetes by a 3-hour glucose tolerance test receive nutritional counseling from a registered dietitian. The ADA also recommends insulin therapy if diet is unsuccessful in achieving a fasting glucose level below 92 mg/dL, a 1-hour postprandial level below 180 mg/dL, or 2-hour postprandial level below 153 mg/dL (ADA, 2012b).

The ACOG (2010b) recommends the use of diet or insulin to achieve a 1-hour postprandial blood glucose level of 130 mg/dL. Both ADA and ACOG believe that further studies are needed to establish the safety of oral antidiabetic agents. Glycemic control—regardless of whether it involves diet, insulin, or oral agents—leads to fewer cases of shoulder dystocia, hyperbilirubinemia requiring phototherapy, nerve palsy, bone fracture, LGA status, and fetal macrosomia (ACOG, 2010b).

Exercise is another important component of comprehensive prenatal care for the pregnant woman with glucose intolerance. Regular exercise helps maintain glucose control by

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increasing the uptake of glucose into the cells and decreasing central obesity, hypertension, and dyslipidemia, which will ultimately decrease the woman's insulin requirements (Gilbert, 2011). Regular physical activity has been proven to result in marked benefits for mother and fetus. Maternal benefits include improved cardiovascular function, limited pregnancy weight gain, decreased musculoskeletal discomfort, reduced incidence of muscle cramps and lower limb edema, mood stability, and reduction of gestational diabetes mellitus and gestational hypertension. Fetal benefits include decreased fat mass, improved stress tolerance, and advanced neurobehavioral maturation. Research also suggests the role of physical activity in prevention of gestational diabetes (Redden, LaMonte, Freudenheim, & Rudra, 2011).

Insulin remains the medication of choice for glycemic control in pregnant and lactating women with any type of diabetes (Moore, 2012). Generally, insulin doses are reduced in the first trimester to prevent hypoglycemia resulting from increased insulin sensitivity as well as from nausea and vomiting. Newer short-acting insulins such as lispro (Humalog) and aspart (NovoLog), which do not cross the placenta, may help reduce postprandial hyperglycemia, episodes of hypoglycemia between meals. Target fasting glucose values of 60 to 90 mg/dL and 1-hour postprandial values less than 120 mg/dL are necessary to provide good glycemic control and good pregnancy outcomes (Moore, 2012). Changes in diet and activity level add to the need for changes in insulin dosages throughout pregnancy.

Insulin regimens vary, and controversy remains over the best strategy for insulin delivery in pregnancy. Many health care providers use a split-dose therapy (two thirds of the daily dose in the morning and the remaining one third in the evening). Others advocate the use of an insulin pump to deliver a continuous subcutaneous insulin infusion. Regardless of which protocol is used, frequent blood glucose measurements are necessary, and the insulin dosage is adjusted on the basis of daily glucose levels. See [Evidence-Based Practice 20.1](#) feature.

EVIDENCE-BASED PRACTICE 20.1: SELECTING METHODS OF INSULIN ADMINISTRATION FOR PREGNANT WOMEN WITH DIABETES

STUDY

Diabetes results in a rise in blood glucose above normal physiologic levels; if untreated this may cause damage to many systems including the cardiovascular and renal systems. Pregnancy leads to a physiologic resistance to insulin action; for those women who have pregestational diabetes, this results in an increasing insulin requirement.

A woman who has diabetes and becomes pregnant is at risk for various problems, both for herself and her fetus. The goal during pregnancy is to maintain optimal glucose control. For

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these women, insulin is the mainstay of treatment. Unfortunately, blood glucose levels are not static and insulin requirements change throughout pregnancy.

Insulin typically is administered subcutaneously, commonly in multiple doses throughout the day. However, it also may be administered via a continuous subcutaneous infusion. The question arises as to which method of insulin administration affords the best control of blood glucose levels. The belief is that the continuous infusions would provide better blood glucose control and thus reduce the risks of problems for the mother and fetus.

A study was conducted comparing the effects of continuous subcutaneous insulin infusions with multiple daily doses of insulin therapy. The study involved a search of randomized controlled trials comparing these two methods of administration and their effect on neonatal birthweight, perinatal mortality, fetal anomalies, and maternal hypo- and hyperglycemia. Five trials involving 153 women and 154 pregnancies were included.

Findings

Women receiving continuous insulin infusions experienced an increase in birth weight of their infants compared to mothers receiving multiple daily doses of insulin. However, the researchers did not identify this difference as clinically significant. The researchers found no significant differences in perinatal mortality, fetal anomalies, or maternal hypo- and hyperglycemia between the two groups. The researchers attributed this to the small number of trials reviewed and the limited sample size of participants in the study. They concluded that there was insufficient evidence to support one method being better than the other. Continuous insulin infusion is safe in pregnancy, but it has not yet been associated with any improved pregnancy outcome. The researchers recommended additional research using a more vigorous approach and larger samples of women.

Nursing Implications

This study, although inconclusive, does underscore the need for glucose control in women with pregestational diabetes. Nurses need to be aware of these findings so that they can integrate knowledge of adequate blood glucose control when teaching pregnant women with diabetes about its potential effects, regardless of the method for insulin administration. Nurses also need to be cognizant of the various methods for insulin administration so that they can incorporate the information from this study to provide individualized care to the pregnant woman with diabetes, thereby promoting the best possible outcomes for the mother and her fetus.

Adapted from Farrar, D., Tuffnell, D. J., & West, J. (2011). Continuous subcutaneous insulin infusion versus multiple daily injections of insulin for pregnant women with diabetes. *Cochrane Database of Systematic Reviews*, 2011(10).
doi:10.1002/14651858.CD005542.pub2.

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Close maternal and fetal surveillance is also essential. Frequent laboratory tests are done during pregnancy to monitor the woman's status and glucose control. Fetal surveillance via diagnostic testing aids in evaluating fetal well-being and assisting in determining the best time for birth.

For the laboring woman with diabetes, intravenous saline or lactated Ringer's is given and blood glucose levels are monitored every 1 to 2 hours. Glucose levels are maintained below 110 mg/dL throughout labor to reduce the likelihood of neonatal hypoglycemia. If necessary, an infusion of regular insulin may be given to maintain this level (ADA, 2012b). If the woman was receiving insulin during her pregnancy, adjustments in dosage may be necessary after birth since glucose diversion across the placenta to supply the growing fetus is no longer present and insulin resistance is now removed. Frequently, the woman with gestational diabetes can remain controlled through diet and weight management; the woman with type 1 diabetes usually returns to prepregnant levels of insulin administration (Scott & Flanagan, 2010).

After giving birth, the overt glycemic abnormalities of gestational diabetes usually resolve. This phenomenon suggests that the diabetes is transient and that the consequences of gestational diabetes end with the birth of the infant. However, for the woman, childbirth is not the end of the story. The diagnosis of gestational diabetes heralds future health risks. Knowledge of this "failed" stress test conveys new information about her future risk for type 2 diabetes, which warrants further screening and prevention efforts during the postpartum period and beyond.

Nursing Assessment

Nursing assessment begins at the first prenatal visit. A thorough history and physical examination in conjunction with specific laboratory and diagnostic testing aids in developing an individualized plan of care for the woman with diabetes.

Health History and Physical Examination

For the woman with pregestational diabetes, obtain a thorough history of the preexisting diabetic condition. Ask about her duration of disease, management of glucose levels (insulin injections, insulin pump, or oral hypoglycemic agents), dietary adjustments, presence of vascular complications and current vascular status, current insulin regimen, and technique used for glucose testing. Review any information that she may have received as part of her preconception counseling and measures that were implemented during this time.

Be knowledgeable about the woman's nutritional requirements and assess the adequacy and pattern of her dietary intake. Assess her blood glucose self-monitoring in terms of technique, frequency, and her ability to adjust the insulin dose based on the changing patterns. Ask about the frequency of episodes of hypoglycemia or hyperglycemia to ascertain the woman's ability to recognize and treat them. Continue to assess her for signs and symptoms of hypo- and hyperglycemia.

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During antepartum visits, assess the client's knowledge about her disease, including the signs and symptoms of hypoglycemia, hyperglycemia, and diabetic ketoacidosis, insulin administration techniques, and the impact of pregnancy on her chronic condition. If possible have the woman demonstrate her technique for blood glucose monitoring and insulin administration if appropriate. It is essential that the nurse keeps in mind that there is a huge learning curve for women with diabetes concerning the need for dietary changes, frequency of blood glucose monitoring, exercise, and insulin or oral medication administration. All of a sudden, the woman is expected to make rapid changes in her life and this can be overwhelming for many. The nurse can help facilitate these changes by exercising patience and understanding and reinforcing all verbal instructions with written material. Frequent encouragement is also needed to assist the woman in her lifestyle changes. Although the client may have had diabetes for some time, do not assume that she has a firm knowledge base about her disease process or management of it ([Fig. 20.2](#)).



FIGURE 20.2

The nurse is demonstrating the technique for self-blood glucose monitoring with a pregnant client who has diabetes.

Assess the woman's risk for gestational diabetes at the first prenatal visit. The ADA (2012e) recommends assessing all women for risk factors and then determining the need for additional testing in the high-risk group only. Factors that place a woman at high risk include:

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- Previous infant with congenital anomaly (skeletal, renal, central nervous system [CNS], cardiac)
- History of gestational diabetes or hydramnios in a previous pregnancy
- Family history of diabetes
- Age 35 years or older
- Previous infant weighing more than 9 pounds (4,000 g)
- Previous unexplained fetal demise or neonatal death
- Maternal obesity (body mass index [BMI] >30)
- Hypertension before pregnancy or in early pregnancy
- Hispanic, Native American, Pacific Islander, or African American ethnicity
- Recurrent monilia infections that do not respond to treatment
- Signs and symptoms of glucose intolerance (polyuria, polyphagia, polydipsia, fatigue)
- Presence of glycosuria or proteinuria (Moore, 2012)

Women with clinical characteristics consistent with a high risk for gestational diabetes should undergo glucose testing as soon as feasible.

Provide close ongoing assessment throughout the antepartal period. Women with gestational diabetes mellitus are at increased risk for preeclampsia and glucose control–related complications such as hypoglycemia, hyperglycemia, and ketoacidosis. Gestational diabetes of any severity increases the risk of fetal macrosomia. It is also associated with an increased frequency of maternal hypertensive disorders and operative births. This may be the result of fetal growth disorders (ADA, 2012e). Even though gestational diabetes is diagnosed during pregnancy, the woman may have had glucose intolerance before the pregnancy. Therefore, monitor the woman closely for signs and symptoms of possible complications.

Also assess the woman's psychosocial adaptation to her condition. This assessment is critical to gain her cooperation for a change in regimen or the addition of a new regimen throughout pregnancy. Identify her support systems and note any financial constraints, because she will need intense monitoring and frequent fetal surveillance.

Laboratory and Diagnostic Testing

The results of laboratory and diagnostic tests provide valuable information about maternal and fetal well-being. Women with pregestational diabetes and those discovered to have gestational diabetes require ongoing maternal and fetal surveillance to promote the best outcome.

SURVEILLANCE

Maternal surveillance may include the following:

- Urine check for protein (may indicate the need for further evaluation for preeclampsia) and for nitrates and leukocyte esterase (may indicate a urinary tract infection)
- Urine check for ketones (may indicate the need for evaluation of eating habits)
- Kidney function evaluation every trimester for creatinine clearance and protein levels
- Eye examination in the first trimester to evaluate the retina for vascular changes

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- HbA1c every 4 to 6 weeks to monitor glucose trends (Kendrick, 2011)
Fetal surveillance may include ultrasound to provide information about fetal growth, activity, and amniotic fluid volume and to validate gestational age. Alpha-fetoprotein levels may be obtained to detect congenital anomalies such as an open neural tube or ventral wall defects of omphalocele or gastroschisis, and a fetal echocardiogram may be necessary to rule out cardiac anomalies. A biophysical profile helps to monitor fetal well-being and uteroplacental perfusion, and nonstress tests commonly are performed weekly after 28 weeks' gestation to evaluate fetal well-being. As the pregnancy progresses, an amniocentesis may be done to determine the lecithin/sphingomyelin (L/S) ratio and the presence of phosphatidyl glycerol (PG) to evaluate whether the fetal lung is mature enough for birth (Moore, 2012).

Nursing Management

The ideal outcome of every pregnancy is a healthy newborn and mother. Nurses can be pivotal in realizing this positive outcome for women with pregestational or gestational diabetes by implementing measures to minimize risks and complications. Since the woman with diabetes is considered to be at high risk, antepartal visits occur more frequently (every 2 weeks up to 28 weeks and then twice a week until birth), providing the nurse with numerous opportunities for ongoing assessment, education, and counseling ([Nursing Care Plan 20.1](#)).

Promoting Optimal Glucose Control

At each visit, review the mother's blood glucose levels, including any laboratory tests and self-monitoring results. Reinforce with the woman the need to perform blood glucose monitoring (usually four times a day: before meals and at bedtime) and to keep a record of the results. If appropriate, obtain a fingerstick blood glucose level to evaluate the accuracy of self-monitoring results.

Also assess the woman's techniques for monitoring blood glucose levels and for administering insulin if ordered, and offer support and guidance. If the woman is receiving insulin therapy, assist with any changes needed if glucose levels are not controlled.

Obtain a urine specimen and check for glucose, protein, and ketones. Ask the woman if she has had any episodes of hypoglycemia and what she did to alleviate them.

Discuss dietary measures related to blood glucose control ([Fig. 20.3](#)). In addition, recommend the following:

- Avoid weight loss and dieting during pregnancy.
- Ensure that food intake is adequate to prevent ketone formation and promote weight gain.
- Eat three meals a day plus three snacks to promote glycemic control:
 - 40% of calories from good-quality complex carbohydrates
 - 35% of calories from protein sources
 - 25% of calories from unsaturated fats.
- Small frequent feedings throughout the day are recommended.

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- Bedtime snacks are recommended for all women.
- Include protein and fat at each meal (National Diabetes Information Clearing House, 2011).



FIGURE 20.3

The pregnant client with diabetes eating a nutritious meal to ensure adequate glucose control.

Take Note!

Nutrient requirements and recommendations for weight gain for the pregnant woman with diabetes are the same as those for the pregnant nondiabetic woman.

If necessary, arrange for consultation with a dietitian or nutritionist to individualize the dietary plan. Also encourage the women to participate in an exercise program that includes at least three sessions lasting longer than 15 minutes per week. Exercise may lessen the need for insulin or dosage adjustments.

When caring for the laboring woman with pregestational or gestational diabetes, adjust the intravenous flow rate and the rate of supplemental regular insulin based on the blood glucose levels as ordered. Monitor blood glucose levels every 1 to 2 hours or more frequently if necessary. Keep a syringe with 50% dextrose solution Retrieved from the bedside to treat profound hypoglycemia. Monitor fetal heart rate patterns throughout labor to detect category II and III patterns. Assess maternal vital signs every hour, in addition to assessing the woman's urinary output with an indwelling catheter. If a cesarean birth is scheduled, monitor the woman's blood glucose levels hourly and administer short-acting insulin or glucose based on the blood glucose levels as ordered.

After birth, monitor blood glucose levels every 2 to 4 hours for the first 48 hours to determine the woman's insulin need and continue intravenous fluid administration as ordered. Encourage breast-feeding to assist in maintaining good glucose control. For the woman with pregestational diabetes and type 1 or 2 diabetes, expect insulin needs to decrease rapidly after birth: they may be reduced by half of the antepartum dose as meals are started (King & Brucker, 2011). Some women may return to their prepregnancy insulin dosage.

NURSING CARE PLAN 20.1: Overview of the Pregnant Woman with Type 1 Diabetes

Donna, a 30-year-old woman with type 1 diabetes, presents to the maternity clinic for preconception care. She has had diabetes for 8 years and takes insulin twice daily by injection. She does blood glucose self-monitoring four times daily. She reports that her disease is fairly well controlled, but "I'm worried about how my diabetes will affect a pregnancy and my baby. Will I need to make changes in my routine? Will my baby be normal?" She reports that she recently had a foot infection and needed to go to the emergency department because it led to an episode of ketoacidosis. She states that her last glycosylated hemoglobin A1c test results were abnormal.

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NURSING DIAGNOSIS: Ineffective health maintenance: maternal related to deficient knowledge regarding care in diabetic condition in pregnancy as evidenced by questions about effect on pregnancy, possible changes in regimen, and pregnancy outcome

Outcome Identification and Evaluation

The client will demonstrate increased knowledge of type 1 diabetes and effects on pregnancy as evidenced by proper techniques for blood glucose monitoring and insulin administration, ability to modify insulin doses and dietary intake to achieve control, and verbalization of need for glycemic control prior to pregnancy, with blood glucose levels remaining within normal range.

Interventions: *Providing Client Teaching*

- Assess client's knowledge of diabetes and pregnancy *to establish a baseline from which to develop an individualized teaching plan.*
- Review the underlying problems associated with diabetes and how pregnancy affects glucose control *to provide client with a firm knowledge base for decision making.*
- Review signs and symptoms of hypoglycemia and hyperglycemia and prevention and management measures *to ensure client can deal with them should they occur.*
- Provide written materials describing diabetes and care needed for control *to provide opportunity for client's review and promote retention of learning.*
- Observe client administering insulin and self-glucose testing for technique and offer suggestions for improvement if needed *to ensure adequate self-care ability.*
- Discuss proper foot care *to prevent future infections.*
- Teach home treatment for symptomatic hypoglycemia *to minimize risk to client and fetus.*
- Outline acute and chronic diabetic complications *to reinforce the importance of glucose control.*
- Discuss use of contraceptives until blood glucose levels can be optimized before conception occurs *to promote best possible health status before conception.*
- Explain the rationale for good glucose control and the importance of achieving excellent glycemic control before pregnancy *to promote a positive pregnancy outcome.*
- Review self-care practices (blood glucose monitoring and frequency of testing; insulin administration; adjustment of insulin dosages based on blood glucose levels) *to foster independence in self-care and feelings of control over the situation.*
- Refer client for dietary counseling *to ensure optimal diet for glycemic control.*
- Outline obstetric management and fetal surveillance needed for pregnancy *to provide client with information on what to expect.*
- Discuss strategies for maintaining optimal glycemic control during pregnancy *to minimize risks to client and fetus.*

NURSING DIAGNOSIS: Anxiety related to threat to self and fetus as evidenced by questions about her condition's effect on the baby and baby being normal

Outcome Identification and Evaluation

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The client will openly express her feelings related to her diabetes and pregnancy as evidenced by statements of feeling better about her preexisting condition and pregnancy outlook, and statements of understanding related to future childbearing by linking good glucose control with positive outcomes for both her and offspring.

Interventions: *Minimizing Anxiety*

- Review the need for a physical examination *to evaluate for any effects of diabetes on the client's health status.*
- Explain the rationale for assessing client's blood pressure, vision, and peripheral pulses at each visit *to provide information related to possible effects of diabetes on health status.*
- Identify any alterations in present diabetic condition that need intervention *to aid in minimizing risks that may increase client's anxiety level.*
- Review potential effects of diabetes on pregnancy *to promote client understanding of risks and ways to control or minimize them.*
- Encourage active participation in decision making and planning pregnancy *to promote feelings of control over the situation and foster self-confidence.*
- Discuss feelings about future childbearing and managing pregnancy *to help reduce anxiety related to uncertainties.*
- Encourage client to ask questions or voice concerns *to help decrease anxiety related to the unknown.*
- Emphasize the use of frequent and continued surveillance of client and fetal status during pregnancy *to reduce the risk of complications and aid in alleviating anxieties related to the unknown.*
- Provide positive reinforcement for healthy behaviors and actions *to foster continued use and enhancement of self-esteem.*

The therapy plan after childbirth is individualized for each woman. If recommended dietary modifications are carried out along with weight loss, the woman with gestational diabetes may return to her normal glucose levels. This is also true for the woman with pregestational diabetes, except that she will return to her prepregnancy insulin administration levels. This provides the nurse with a wonderful opportunity to reinforce healthy lifestyle interventions on the postpartum unit. Nurses can also become involved with community-based education to continue to offer their expertise.

Preventing Complications

Assess the woman closely for signs and symptoms of complications at each visit. Anticipate possible complications and plan appropriate interventions or referrals.

Check the woman's blood pressure for changes and evaluate for proteinuria when obtaining a urine specimen. These might suggest the development of preeclampsia. Measure fundal height and review gestational age. Note any discrepancies between fundal height and gestational age or a sudden increase in uterine growth. These may suggest hydramnios.

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Encourage the woman to perform daily fetal movement counts to monitor fetal well-being. Tell her specifically when she should notify her health care provider. Also prepare the woman for the need for frequent laboratory and diagnostic testing to evaluate fetal status. Assist with serial ultrasounds to monitor fetal growth and with nonstress tests and biophysical profiles to assess fetal well-being.

Providing Client Education and Counseling

The pregnant woman with diabetes requires counseling and education about the need for strict glucose monitoring, diet and exercise, and signs and symptoms of complications. Encourage the client and her family to make any lifestyle changes needed to optimize the pregnancy outcome. Providing dietary education, weight control measures, and lifestyle advice that extends beyond pregnancy may lower the risk that the woman will have gestational diabetes in subsequent pregnancies as well as type 2 diabetes (Kim, 2010). At each visit stress the importance of performing blood glucose screening and documenting the results. With proper instruction, the client and her family will be able to cope with all the changes in her body during pregnancy ([Teaching Guidelines 20.1](#)).

Teaching Guidelines 20.1: TEACHING FOR THE PREGNANT WOMAN WITH DIABETES

- Be sure to keep your appointments for frequent prenatal visits and tests for fetal well-being.
- Perform blood glucose self-monitoring as directed, usually before each meal and at bedtime. Keep a record of your results and call your health care provider with any levels outside the established range. Bring your results to each prenatal visit.
- Perform daily “fetal kick counts.” Document them and report any decrease in activity.
- Drink eight to ten 8-ounce glasses of water each day to prevent bladder infections and maintain hydration.
- Wear proper, well-fitted footwear when walking to prevent injury.
- Engage in a regular exercise program such as walking to aid in glucose control, but avoid exercising in temperature extremes.
- Consider breast-feeding your infant to lower your blood glucose levels.
- If you are taking insulin:
 - Administer the correct dose of insulin at the correct time every day.
 - Eat breakfast within 30 minutes after injecting regular insulin to prevent a reaction.
 - Plan meals at a fixed time and snacks to prevent extremes in glucose levels.
- Avoid simple sugars (cake, candy, cookies), which raise blood glucose levels.
- Know the signs and symptoms of hypoglycemia and treatment needed:
 - Sweating, tremors, cold, clammy skin, headache
 - Feeling hungry, blurred vision, disorientation, irritability

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- Treatment: Drink 8 ounces of milk and eat two crackers or glucose tablets
- Carry “glucose boosters” (such as Life Savers) to treat hypoglycemia.
- Know the signs and symptoms of hyperglycemia and treatment needed:
 - Dry mouth, frequent urination, excessive thirst, rapid breathing
 - Feeling tired, flushed, hot skin, headache, drowsiness
 - Treatment: Notify health care provider, because hospitalization may be needed
- Wear a diabetic identification bracelet at all times.
- Wash your hands frequently to prevent infections.
- Report any signs and symptoms of illness, infection, and dehydration to your health care provider, because these can affect blood glucose control.

Consider This

Scott and I had been busy all day setting up the new crib in our nursery, and we finally sat down to rest. I was due any day, and we had been putting this off until we had a long weekend to complete the task. I was excited to think about all the frilly pinks that decorated her room. I was sure that my new daughter would love it as much as I loved her already. A few days later I barely noticed any fetal movement, but I thought that she must be as tired as I was by this point.

That night I went into labor and kept looking at the worried faces of the nurses and the midwife in attendance. I had been diagnosed with gestational diabetes a few months ago and had tried to follow the instructions regarding diet and exercise, but old habits are hard to change when you are 38 years old. I was finally told after a short time in the labor unit that they couldn't pick up a fetal heartbeat and an ultrasound was to be done—still no heartbeat was detected. Scott and I were finally told that our daughter was a stillborn. All I could think about was that she would never get to see all the pink colors in the nursery.

Review discussions about the timing of birth and the rationale. Counsel the client about the possibility of cesarean birth for an LGA infant, or inform the woman who will be giving birth vaginally about the possible need for augmentation with oxytocin (Pitocin).

Take Note!

In the woman with well-controlled diabetes, birth is typically not induced before term unless complications arise, such as preeclampsia or fetal compromise. An early delivery date might be set for the woman with poorly controlled diabetes who is having complications.

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Instruct the client about the benefits of breast-feeding related to blood glucose control. Breast-feeding helps to normalize blood glucose levels. Therefore, encourage the woman to breast-feed her newborn. Also teach the woman receiving insulin for her diabetes that her insulin needs after birth will drastically decrease. Inform her that she will need a repeat glucose challenge test at a postpartum visit (ADA, 2012d).

For the woman with gestational diabetes, the focus is on lifestyle education. Women with gestational diabetes have a greater than 50% increased risk of developing type 2 diabetes (ADA, 2012d). Inform the woman that screening most likely will be done at the postpartum follow-up appointment in 6 weeks. Women with normal results at that visit typically are screened every 3 years thereafter (ADA, 2012d). Teach her how to maintain an optimal weight to reduce her risk of developing diabetes. If necessary, refer the woman to a dietitian to help outline a balanced nutritious diet.

CARDIOVASCULAR DISORDERS

Every minute, an American woman dies of cardiovascular disease and more than one in three women is living with a cardiovascular disorder, including nearly half of all African American women and 34% of Caucasian women (American Heart Association [AHA], 2012). Cardiovascular disease (CVD) is the leading cause of death for men and women in the United States. It kills nearly 500,000 women each year. Despite the prominent reduction in cardiovascular mortality among men, the rate has not declined for women. Cardiovascular disease has killed more women than men since 1984 (AHA, 2012). In addition to being the number-one killer of women, at the time of diagnosis women have both a poorer overall prognosis and a higher risk of death than men diagnosed with heart disease. Women represent 53% of CVD deaths (Kim, Draska, Hess, Wilson & Richardson 2012; Herman 2012). In both men and women risk factors such as hypertension, high blood cholesterol level, smoking, lack of physical activity, and obesity increase the probability of developing CVD. Menopause, oral contraceptive use, and bilateral oophorectomy in premenopausal women also affect the risk of CVD in women (Zhang, 2010).

More women die of heart disease, stroke, and other cardiovascular diseases than men, yet many women do not realize they are at risk. These diseases kill more women each year than the next three causes of death combined, including all types of cancer (AHA, 2012).

Approximately 3% of pregnant women have cardiac disease, which is responsible for 10% to 25% of maternal deaths (Cunningham et al., 2009). The prevalence of cardiac disease is increasing as a result of lifestyle patterns, including cigarette smoking, diabetes, and stress. As women are delaying childbearing, the incidence of cardiac disease in pregnancy will continue to increase. The cardiovascular adaptations during pregnancy are well tolerated by the normal heart, but may unveil undiagnosed underlying heart disease, or tip the hemodynamic balance and lead to decompensation in those with existing heart disease (Brooks, 2011).

Rheumatic heart disease used to represent the majority of cardiac conditions during pregnancy, but congenital heart disease now constitutes nearly half of all cases of heart disease encountered during pregnancy. Classic symptoms of heart disease mimic common symptoms of late pregnancy, such as palpitations, shortness of breath with exertion, and occasional chest pain. Few women with heart

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disease die during pregnancy, but they are at risk for other complications, such as heart failure, arrhythmias, and stroke. Their offspring are also at risk of complications, such as premature birth, low birth weight for gestational age, respiratory distress syndrome, intraventricular hemorrhage, and death (Thanajiraprapa & Phupong, 2010).

Congenital and Acquired Heart Disease

Congenital heart disease often involves structural defects that are present at birth but may not be discovered at that time (**Table 20.3**). Until recently women with congenital heart disease did not live long enough to bear children.

Today, due to new surgical techniques to correct these defects, many of these women can complete a successful pregnancy at relatively low risk when appropriate counseling and optimal care are provided. Increasing numbers of women with complex congenital heart disease are reaching childbearing age. Complications such as growth restriction, preterm and premature birth, and fetal and neonatal mortality are more common among children of women with congenital heart disease. The risk of complications is determined by the severity of the cardiac lesion, the presence of cyanosis, the maternal functional class, and the use of anticoagulation therapy (Simpson 2012).

TABLE 20.3: SELECTED HEART CONDITIONS AFFECTING PREGNANCY

Condition	Description	Management
<i>Congenital</i>		
Tetralogy of Fallot	Congenital defect involving four structural anomalies: obstruction to pulmonary flow; ventricular septal defect (abnormal opening between the right and left ventricles); dextroposition of the aorta (aortic opening overriding the septum and receiving blood from both ventricles); and right ventricular hypertrophy (increase in volume of the myocardium of the right ventricle)	Hospitalization and bed rest possible after the 20th week with hemodynamic monitoring via a pulmonary artery catheter to monitor volume status Oxygen therapy may be necessary during labor and birth.

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Condition	Description	Management
Atrial septal defect (ASD)	<p>Congenital heart defect involving a communication or opening between the atria with left-to-right shunting due to greater left-sided pressure</p> <p>Arrhythmias present in some women.</p>	Treatment with atrioventricular nodal blocking agents, and at times with electrical cardioversion
Ventricular septal defect (VSD)	<p>Congenital heart defect involving an opening in the ventricular septum, permitting blood flow from the left to the right ventricle. Complications include arrhythmias, heart failure, and pulmonary hypertension.</p>	Rest with limited activity if symptomatic
Patent ductus arteriosus	<p>Abnormal persistence of an open lumen in the ductus arteriosus between the aorta and the pulmonary artery after birth; results in increased pulmonary blood flow and redistribution of flow to other organs.</p>	Surgical ligation of the open ductus during infancy; subsequent problems minimal after surgical correction
<i>Acquired</i>		
Mitral valve prolapse	<p>Very common in the general population, occurring most often in younger women</p> <p>Leaflets of the mitral valve prolapse into the left atrium during ventricular contraction.</p> <p>The most common cause of mitral valve regurgitation if present during pregnancy</p> <p>Usually improvements in mitral valve function due to increased blood volume and decreased systemic vascular resistance of pregnancy; most women are able to tolerate pregnancy well.</p>	<p>Most women are asymptomatic; diagnosis is made incidentally.</p> <p>Occasional palpitations, chest pain, or arrhythmias in some women, possibly requiring beta blockers</p> <p>Usually no special precautions are necessary during pregnancy.</p>
Mitral valve stenosis	<p>Most common chronic rheumatic valvular lesion in pregnancy</p> <p>Causes obstruction of blood flow from the atria to the ventricle, thereby decreasing ventricular filling and causing a fixed cardiac output</p>	General symptomatic improvement with medical management involving diuretics, beta blockers, and anticoagulant therapy

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Condition	Description	Management
	<p>Resultant pulmonary edema, pulmonary hypertension, and right ventricular failure</p> <p>Most pregnant women with this condition can be managed medically.</p>	<p>Activity restriction, reduction in sodium, and potentially bed rest if condition severe</p>
Aortic stenosis	<p>Narrowing of the opening of the aortic valve, leading to an obstruction to left ventricular ejection</p> <p>Women with mild disease can tolerate hypervolemia of pregnancy; with progressive narrowing of the opening, cardiac output becomes fixed. Diagnosis can be confirmed with echocardiography. Most women can be managed with medical therapy, bed rest, and close monitoring.</p>	<p>Diagnosis confirmed with echocardiography</p> <p>Pharmacologic treatment with beta blockers and/or antiarrhythmic agents to reduce risk of heart failure and/or dysrhythmias</p> <p>Bed rest/limited activity and close monitoring</p>
Peripartum cardiomyopathy	<p>Rare congestive cardiomyopathy that may arise during pregnancy. Multiparity, age, multiple fetuses, hypertension, an infectious agent, autoimmune disease, or cocaine use may contribute to its presence.</p> <p>Development of heart failure in the last month of pregnancy or within 5 months of giving birth without any preexisting heart disease or any identifiable cause</p>	<p>Preload reduction with diuretic therapy</p> <p>Afterload reduction with vasodilators</p> <p>Improvement in contractility with inotropic agents</p> <p>Nonpharmacologic approaches include salt restriction and daily exercise such as walking or biking.</p> <p>The question of whether another pregnancy should be attempted is controversial due to the high risk of repeat complications.</p>
Myocardial infarction (MI)	<p>Rare during pregnancy but incidence is expected to increase as older women are becoming pregnant and the risk factors for coronary artery disease become more prevalent.</p>	<p>Usual treatment modalities for any acute MI along with consideration for the fetus</p> <p>Anticoagulant therapy, rest, and lifestyle changes to</p>

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Condition	Description	Management
	Factors contributing to MI include family history, stress, smoking, age, obesity, multiple fetuses, hypercholesterolemia, and cocaine use.	preserve the health of both parties
	Increased plasma volume and cardiac output during pregnancy increase the cardiac workload as well as the myocardial oxygen demands; imbalance in supply and demand may contribute to myocardial ischemia.	

Adapted from Gardner, S. L., Carter, B. S., Enzman-Hines, M., & Hernandez, J. A. (2011). *Merenstein & Gardner's handbook of neonatal intensive care* (7th ed.). St. Louis, MO: Mosby Elsevier; Gilbert, E. S. (2011). *Manual of high risk pregnancy and delivery* (5th ed.). St. Louis, MO: Mosby Elsevier; and Mattson, S., & Smith, J.E. (2011). *Core curriculum for maternal–newborn nursing* (4th ed.). St. Louis, MO: Saunders Elsevier.

Women with certain congenital conditions should avoid pregnancy. These include uncorrected tetralogy of Fallot or transposition of the great arteries, and Eisenmenger's syndrome, a defect with both cyanosis and pulmonary hypertension (Redberg, 2010).

Acquired heart diseases are conditions affecting the heart and its associated blood vessels that develop during a person's lifetime, in contrast to congenital heart diseases, which are present at birth. Acquired heart diseases include coronary artery disease, coronary heart disease, rheumatic heart disease, diseases of the pulmonary vessels and the aorta, diseases of the tissues of the heart, and diseases of the heart valves. The incidence of rheumatic heart disease has declined dramatically in the past several decades because of prompt identification of streptococcal throat infections and treatment with antibiotics. When the heart is involved, valvular lesions, such as mitral stenosis, prolapse, or aortic stenosis, are common (see [Table 20.3](#)).

Many women are postponing childbearing until their 30s and 40s. With advancing maternal age, underlying medical conditions such as hypertension, diabetes, and hypercholesterolemia contributing to ischemic heart disease become more common and increase the incidence of acquired heart disease complicating pregnancy. Coronary artery disease and myocardial infarction may result.

A woman's ability to function during the pregnancy is often more important than the actual diagnosis of the cardiac condition. The following is a functional classification system developed by the Criteria Committee of the New York Heart Association (1994) based on past and present disability and physical signs:

- *Class I*: asymptomatic with no limitation of physical activity; no objective evidence of cardiac disease.

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- *Class II:* symptomatic (dyspnea, chest pain) with increased activity resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain.
- *Class III:* symptomatic (fatigue, palpitations) with normal activity resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnea, or anginal pain.
- *Class IV:* symptomatic at rest or with any physical activity resulting in inability to carry on any physical activity without discomfort. Symptoms of heart failure or the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased. The classification may change as the pregnancy progresses and the woman's body must cope with the increasing stress on the cardiovascular system resulting from the numerous physiologic changes taking place. Typically, a woman with class I or II cardiac disease can go through a pregnancy without major complications. A woman with class III disease usually has to maintain bed rest during pregnancy. A woman with class IV disease should avoid pregnancy (Pieper, 2011). Women with cardiac disease may benefit from preconception counseling so that they know the risks before deciding to become pregnant.

Maternal mortality varies directly with the functional class at pregnancy onset. ACOG has adopted a three-tiered classification according to the risk of death during pregnancy ([Box 20.1](#)).

BOX 20.1: CLASSIFICATION OF MATERNAL MORTALITY RISK

Group I (minimal risk) has a mortality rate of 1% and comprises women with:

- Patent ductus arteriosus
- Tetralogy of Fallot, corrected
- Atrial septal defect
- Ventricular septal defect
- Mitral stenosis, class I and II

Group II (moderate risk) has a mortality rate of 5% to 15% and comprises women with:

- Tetralogy of Fallot, uncorrected
- Mitral stenosis with atrial fibrillation
- Aortic stenosis, class III and IV
- Aortic coarctation without valvular involvement
- Artificial valve replacement

Group III (major risk) has a 25% to 50% mortality rate and comprises women with:

- Pulmonary hypertension
- Complicated aortic coarctation
- Previous myocardial infarction

Adapted from American Heart Association. (2012). *Women and heart disease*. Retrieved from http://www.heart.org/HEARTORG/Advocate/IssuesandCampaigns/QualityCare/Women-and-Heart-Disease_UCM_430484_Article.jsp; Brooks, R. (2011).

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Pregnancy and heart disease: An introduction. *British Journal of Midwifery*, 19(12), 763–772; and Gilbert, E. S. (2011). *Manual of high risk pregnancy and delivery* (5th ed.). St. Louis, MO: Mosby Elsevier.

Pathophysiology

Numerous hemodynamic changes occur in all pregnant women. These normal physiologic changes can overstress the woman's cardiovascular system, increasing her risk for problems. Increased cardiac workload and greater myocardial oxygen demand during pregnancy place the woman's cardiovascular system at high risk for morbidity and mortality.

Pregnancy causes cardiac output to rise as early as the first trimester, reaching peak values at 20 to 24 weeks, and continues to increase until it plateaus between 28 and 34 weeks' gestation. This rise in cardiac output is due to a 30% to 50% increase in blood volume (stroke volume) and a 30% increase in heart rate. A normal resting heart rate for any pregnant woman can be on average 20 beats per minute above her normal values.

Take Note!

Uterine blood flow increases by at least 1 liter per minute, requiring the body to produce more blood during pregnancy. This results in a 25% increase in red blood cells, a 50% expansion of plasma volume during pregnancy, and an overall hemodilution. In addition, the increase in total red blood cellular volume includes an increase in clotting factors and platelets, defining the hypercoagulable state of pregnancy (Tsiaras & Poppas, 2010). These changes start as early as the second month of gestation.

Similarly, cardiac output increases steadily during pregnancy by 30% to 50% over prepregnancy levels. Stroke volume increases 20% to 30% from prepregnant levels, and the maternal heart rate increases by 10 to 20 beats per minute (bpm). The increase is due to both the expansion in blood volume and the augmentation of stroke volume and heart rate. Other hemodynamic changes associated with pregnancy include a decrease in both the systemic vascular resistance and pulmonary vascular resistance, thereby lowering the systolic and diastolic blood pressure. In addition, the hypercoagulability associated with pregnancy might increase the risk of arterial thrombosis and embolization. These normal physiologic changes are important for a successful adaptation to pregnancy but create unique physiologic challenges for the woman with cardiac disease (Comparison Chart 20.1).

COMPARISON CHART 20.1: CARDIOVASCULAR
 CHANGES: PREPREGNANCY VS. PREGNANCY

Measurement	Prepregnancy	Pregnancy
Heart rate	72 (±10 bpm)	+10–20%
Cardiac output	4.3 (±0.9 L/min)	+30–50%
Blood volume	5 L	+20–50%
Stroke volume	73.3 (±9 mL)	+30%
Systemic vascular resistance	1,530 (±520 dyne/cm/sec)	–20%
Oxygen consumption	250 mL/min	+20–30%

Adapted from American Heart Association [AHA]. (2012). *Women and heart disease*. Retrieved from http://www.heart.org/HEARTORG/Advocate/IssuesandCampaigns/QualityCare/Women-and-Heart-Disease_UCM_430484_Article.jsp; Brooks, R. (2011). Pregnancy and heart disease: An introduction. *British Journal of Midwifery*, 19(12), 763-772; Franklin, W. J., Benton, M., & Parekh, D. R. (2011). Cardiac disease in pregnancy. *Texas Heart Institute Journal*, 38(2), 151–153; and Mattson, S., & Smith, J.E. (2011). *Core curriculum for maternal–newborn nursing* (4th ed.). St. Louis, MO: Saunders Elsevier.

Therapeutic Management

Ideally, a woman with a history of congenital or acquired heart disease should consult her health care provider before becoming pregnant and should undergo a risk assessment. This risk assessment must consider the woman’s functional capacity, exercise tolerance, degree of cyanosis, medication needs, and history of arrhythmias. Data needed for risk assessment can be acquired from a thorough cardiovascular history and examination, a 12-lead electrocardiogram (ECG), and evaluation of oxygen saturation levels by pulse oximetry. The impact of heart disease on a woman’s childbearing potential needs to be clearly explained, and providing information on how pregnancy may affect her and the fetus is important. This allows women to make an informed choice about whether they wish to accept the risks associated with pregnancy. When possible, any surgical procedures, such as valve replacement, should be done before pregnancy to improve fetal and maternal outcomes (Yap et al., 2010).

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If the woman presents for care after she has become pregnant, prenatal counseling focuses on the impact of the hemodynamic changes of pregnancy, the signs and symptoms of cardiac compromise, and dietary and lifestyle changes needed. More frequent prenatal visits (every 2 weeks until the last month and then weekly) are usually needed to ensure the health and safety of the mother and fetus.

Nursing Assessment

Frequent and thorough assessments are crucial during the antepartum period to ensure early detection of and prompt intervention for problems. Assess the woman's vital signs, noting any changes. Auscultate the apical heart rate and heart sounds, being especially alert for abnormalities, including irregularities in rhythm or murmurs. Check the client's weight and compare to baseline and weights obtained on previous visits. Report any weight gain outside recommended parameters. Inspect the extremities for edema and note any pitting.

Question the woman about fetal activity, and ask if she has noticed any changes. Report any changes such as a decrease in fetal movements. Ask the woman about any symptoms of preterm labor, such as low back pain, uterine contractions, and increased pelvic pressure and vaginal discharge, and report them immediately. Assess the fetal heart rate and review serial ultrasound results to monitor fetal growth.

Assess the client's lifestyle and her ability to cope with the changes of pregnancy and its effect on her cardiac status and ability to function. Evaluate the client's understanding of her condition and what restrictions and lifestyle changes may be needed to provide the best outcome for her and her fetus. A healthy infant and mother at the end of pregnancy is the ultimate goal. As the client's pregnancy advances, expect her functional class to be revised based on her level of disability. Suggest realistic modifications.

The nurse plays a major role in recognizing the signs and symptoms of cardiac decompensation. Decompensation refers to the heart's inability to maintain adequate circulation. As a result, tissue perfusion in the mother and the fetus is impaired. The pregnant woman is most vulnerable for this complication from 28 to 32 weeks of gestation and in the first 48 hours postpartum (Thanajiraprapa & Phupong, 2010). Assess the woman for the following signs and symptoms:

- Shortness of breath on exertion, dyspnea
- Cyanosis of lips and nail beds
- Swelling of face, hands, and feet
- Jugular vein engorgement
- Rapid respirations
- Abnormal heartbeats, reports of heart racing or palpitations
- Chest pain with effort or emotion
- Syncope with exertion
- Increasing fatigue
- Moist, frequent cough

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Take Note!

Assessing the pregnant woman with heart disease for cardiac decompensation is vital because the mother's hemodynamic status determines the health of the fetus.

Nursing Management

Nursing management of the pregnant woman with heart disease focuses on assisting with measures to stabilize the mother's hemodynamic status, because a decrease in maternal blood pressure or volume will cause blood to be shunted away from the uterus, thus reducing placental perfusion. Pregnant women with cardiac disease also need assistance in reducing risks that would lead to complications or further cardiac compromise. Therefore, education and counseling are critical. Collaboration between the cardiologist, obstetrician, perinatologist, and nurse is needed to promote the best possible outcome.

Drug therapy may be indicated for the pregnant woman with a cardiac disorder. Possible drugs include diuretics, such as Lasix, to prevent heart failure; digitalis to increase contractility and decrease heart rates; antiarrhythmic agents (lidocaine); beta blockers (labetalol); calcium channel blockers (nifedipine) to treat hypertension; and anticoagulants (low-molecular-weight heparin). Warfarin (Coumadin) is not recommended because it crosses the placenta and may have teratogenic effects. Warfarin is a U.S. Food and Drug Administration (FDA) Pregnancy Category X drug. It has been associated with spontaneous abortion, multiple birth defects, fetal growth restriction, and stillbirth (King & Brucker, 2011). The FDA's risk categories are as follows:

- Category A: Controlled human studies show no risk
- Category B: No evidence of risk in humans, but no controlled human studies are documented
- Category C: Risk to humans has not been excluded
- Category D: Positive evidence of risk to humans from human and/or animal studies
- Category X: Contraindicated in pregnancy

Encourage the woman to continue taking her cardiac medications as prescribed. Review the indications, actions, and potential side effects of the medications. Reinforce the importance of frequent antepartal visits and close medical supervision throughout the pregnancy.

Discuss the need to conserve energy. Help the client to prioritize household chores and child care to allow rest periods. Encourage the client to rest in the side-lying position, which enhances placental perfusion.

Encourage the client to eat nutritious foods and consume a high-fiber diet to prevent straining and constipation. Discuss limiting sodium intake if indicated to reduce fluid retention. Contact a dietitian to assist the woman in planning nutritionally appropriate meals.

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Assist the woman in preparing for diagnostic tests to evaluate fetal well-being. Describe the tests that may be done, such as ECG and echocardiogram, and explain the need for serial nonstress testing, usually beginning at approximately 32 weeks' gestation.

Instruct the woman in how to monitor fetal activity and movements. Urge her to do this daily and report any changes in activity immediately.

Although the morbidity and mortality rates of pregnant women with cardiac disease have decreased greatly, hemodynamic changes during pregnancy (increased heart rate, stroke volume, cardiac output and blood volume) have a profound effect, which may increase cardiac work and might exceed the functional capacity of the diseased heart. These changes may result in pulmonary hypertension, pulmonary edema, heart failure, or maternal death (Mattson & Smith, 2011). Explain the signs and symptoms of these complications and review the sign and symptoms of cardiac decompensation, encouraging the woman to notify her health care provider if any occur.

Provide support and encouragement throughout the antepartal period. Assess the support systems available to the client and her family, and encourage her to use them. If necessary, assist with referrals to community services for additional support.

During labor, anticipate the need for invasive hemodynamic monitoring, and make sure the woman has been prepared for this beforehand. Monitor her fluid volume carefully to prevent overload. Anticipate the use of epidural anesthesia if a vaginal birth is planned. After birth, assess the client for fluid overload as peripheral fluids mobilize. This fluid shift from the periphery to the central circulation taxes the heart, and signs of heart failure such as cough, progressive dyspnea, edema, palpitations, and crackles in the lung bases may ensue before postpartum diuresis begins.

Because hemodynamics do not return to baseline for several days after childbirth, women at intermediate or high risk require monitoring for at least 48 hours postpartum (Carlin, 2010).

Chronic Hypertension

Chronic hypertension exists when the woman has high blood pressure before pregnancy or before the 20th week of gestation, or when hypertension persists for more than 12 weeks postpartum. The *Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (Joint National Committee, 2003) has classified blood pressure as follows:

- Normal: systolic less than 120 mm Hg, diastolic less than 80 mm Hg
- Prehypertension: systolic 120 to 139 mm Hg, diastolic 80 to 89 mm Hg
- Mild hypertension: systolic 140 to 159 mm Hg, diastolic 90 to 99 mm Hg
- Severe hypertension: systolic 160 mm Hg or higher, diastolic 100 mm Hg or higher

Chronic hypertension occurs in up to 22% of women of childbearing age, with the prevalence varying according to age, race, and BMI. It complicates at least 5% of pregnancies, with one in four women developing preeclampsia during pregnancy (Czeizel & Bánhidly, 2011). Chronic hypertension is typically seen in older, obese women with glucose intolerance. The most common complication is preeclampsia,

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which is seen in approximately 25% of women who enter the pregnancy with hypertension (Gilbert, 2011). (See [Chapter 19](#) for more information about preeclampsia.)

Therapeutic Management

Preconception counseling is important in fostering positive outcomes. Typically, it involves lifestyle changes such as diet, exercise, weight loss, and smoking cessation.

Treatment for women with chronic hypertension focuses on maintaining normal blood pressure, preventing superimposed preeclampsia/eclampsia, and ensuring normal fetal development. Once the woman is pregnant, antihypertensive agents are typically reserved for severe hypertension >160 mm Hg systolic and >100 mm Hg diastolic. Methyldopa (Aldomet) is commonly prescribed because of its safety record during pregnancy. This slow-acting antihypertensive agent helps to improve uterine perfusion. Other antihypertensive agents that can be used include labetalol (Trandate), atenolol (Tenormin), and nifedipine (Procardia) (Gilbert, 2011).

Lifestyle changes are needed and should continue throughout gestation. The woman with chronic hypertension will be seen more frequently (every 2 weeks until 28 weeks and then weekly until birth) to monitor her blood pressure and to assess for any signs of preeclampsia. At approximately 24 weeks' gestation, the woman will be instructed to document fetal movement. At this same time, serial ultrasounds will be ordered to monitor fetal growth and amniotic fluid volume. Additional tests will be included if the client's status changes.

Nursing Assessment

Nursing assessment of the woman with chronic hypertension involves a thorough history and physical examination. Review the woman's history closely for risk factors. The pathogenesis of hypertension is multifactorial and includes many modifiable risk factors such as smoking, obesity, caffeine intake, excessive alcohol intake, excessive salt intake, and use of nonsteroidal anti-inflammatory drugs. Also be alert for nonmodifiable risk factors such as increasing age and African American race (Seely & Ecker, 2011). Ask if the woman has received any preconceptual counseling and what measures have been used to prevent or control hypertension.

Assess the woman's vital signs, in particular her blood pressure. Evaluate her blood pressure in all three positions (sitting, lying, and standing) and note any major differences in the readings. Assess her for orthostatic hypertension when she changes her position from sitting to standing. Document your findings.

Ask the woman if she monitors her blood pressure at home; if so, inquire about the typical readings. Ask the woman if she uses any medications for blood pressure control, including the drug, dosage, and frequency of administration, as well as any side effects. Ask the woman about lifestyle modifications that she has used to address any modifiable risk factors, and their effectiveness.

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Hypertension during pregnancy decreases uteroplacental perfusion. Therefore, fetal well-being must be assessed and closely monitored. Anticipate serial ultra-sounds to assess fetal growth and amniotic fluid volume. Question the woman about fetal movement and evaluate her report of daily "kick counts." Assess fetal heart rate at every visit.

Nursing Management

Preconception counseling is the ideal time to discuss lifestyle changes to prevent or control hypertension. One area to cover during this visit would be the Dietary Approaches to Stop Hypertension (DASH) diet, which contains an adequate intake of potassium, magnesium, and calcium. Sodium is usually limited to 2.4 g. Suggest aerobic exercise as tolerated. Encourage smoking cessation and avoidance of alcohol. If the woman is overweight, encourage her to lose weight before becoming pregnant, not during the pregnancy (Dudek, 2010). Stressing the positive benefits of a healthy lifestyle might help motivate the woman to make the necessary modifications and change unhealthy habits.

Assist the woman in scheduling appointments for antepartum visits every 2 weeks until 28 weeks' gestation and then weekly. Prepare the woman for frequent fetal assessments. Explaining the rationale for the need to monitor fetal growth is important to gain the woman's cooperation. Carefully monitor the woman for signs and symptoms of abruptio placenta (abdominal pain, rigid abdomen, vaginal bleeding), as well as superimposed preeclampsia (elevation in blood pressure, weight gain, edema, proteinuria). Alerting the woman to these risks allows early identification and prompt intervention.

Stress the importance of daily periods of rest (1 hour) in the left lateral recumbent position to maximize placental perfusion. Encourage women with chronic hypertension to use home blood pressure monitoring devices. Urge the woman to report any elevations. As necessary, instruct the woman and her family how to take and record a daily blood pressure, and reinforce the need for her to take her medications as prescribed to control her blood pressure and to ensure the well-being of her unborn child. Praising her for her efforts at each prenatal visit may motivate her to continue the regimen throughout her pregnancy.

The close monitoring of the woman with chronic hypertension continues during labor and birth and during the postpartum period to prevent or identify the onset of preeclampsia. Accurate and frequent blood pressure readings and careful administration of antihypertensive medications, if prescribed, are essential components of care. Stressing the need for continued medical supervision after childbirth is vital to motivate the woman to maintain or initiate lifestyle changes and dietary habits and stay compliant with her medication regimen.

RESPIRATORY CONDITIONS

During pregnancy, the respiratory system is affected by hormonal changes, mechanical changes, and prior respiratory conditions. These changes can cause a woman with a history of compromised respiration to decompensate during pregnancy. Although upper respiratory infections are typically self-limiting, chronic respiratory conditions, such as asthma or tuberculosis, can have a negative effect on

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the growing fetus when alterations in oxygenation occur in the mother. The outcome of pregnancy in a woman with a respiratory condition depends on the severity of the oxygen alteration as well as the degree and duration of hypoxia on the fetus.

Asthma

Worldwide the prevalence of asthma among pregnant women is on the rise, and pregnancy leads to a worsening of asthma for many women (Murphy & Gibson, 2011). Asthma affects approximately 4% to 8% of pregnancies, ranging between 200,000 and 376,000 women annually in the United States. It affects over 20 million Americans and is one of the most common and potentially serious medical conditions to complicate pregnancy (Dombrowski, 2010). Maternal asthma is associated with an increased risk of infant death, preeclampsia, intrauterine growth restriction (IUGR), preterm birth, and low birth weight. These risks are linked to the severity of asthma: more severe asthma increases the risk (National Asthma Education and Prevention Program [NAEPP], 2012).

Remember Rose, the pregnant teenager with asthma in acute distress described at the beginning of the chapter? What therapies might be offered to control her symptoms? Should she be treated differently than someone who is not pregnant? Why or why not?

Pathophysiology

Asthma, an allergic-type inflammatory response of the respiratory tract to various stimuli, is also known as reactive airway disease because the bronchioles constrict in response to allergens, irritants, and infections. Asthma is characterized by paroxysmal or persistent symptoms of bronchoconstriction including breathlessness, chest tightness, cough, and sputum production. In addition to bronchoconstriction, inflammation of the airways produces thick mucus that further limits the movement of air and makes breathing difficult.

The normal physiologic changes of pregnancy affect the respiratory system. Although the respiratory rate does not change, hyperventilation increases at term by 48% due to high progesterone levels. Diaphragmatic elevation and a decrease in functional lung residual capacity occur late in pregnancy, which may reduce the woman's ability to inspire deeply to take in more oxygen. Oxygen consumption and the metabolic rate both increase, placing additional stress on the woman's respiratory system (American Academy of Allergy, Asthma, & Immunology [AAAAI], 2012).

Both the woman and her fetus are at risk if asthma is not well managed during pregnancy. When a pregnant woman has trouble breathing, her fetus also has trouble getting the oxygen it needs for adequate growth and development. Severe persistent asthma has been linked to the development of maternal hypertension, preeclampsia, placenta previa, uterine hemorrhage, and oligohydramnios. Women whose asthma is poorly controlled during pregnancy are at increased risk of preterm birth, low birth weight, and stillbirth (Hardy-Fairbanks & Baker, 2010).

The severity of the condition improves in one third of pregnant women, remains unchanged in one third, and worsens in one third (Gilbert, 2011). However, the effect of pregnancy on asthma is

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unpredictable. The greatest increase in asthma attacks usually occurs between 24 and 36 weeks' gestation; flare-ups are rare during the last 4 weeks of pregnancy and during labor (AAAAI, 2012).

Therapeutic Management

Asthma should be treated as aggressively in pregnant women as in nonpregnant women because the benefits of averting an asthma attack outweigh the risks of medications. The ultimate goal of asthma therapy is to prevent hypoxic episodes to preserve continuous fetal oxygenation; improved maternal and perinatal outcomes are achieved with optimal control of asthma. One third of women with asthma develop worsening of control during pregnancy, therefore close monitoring and reevaluation are essential. Four important aspects of asthma treatment ensure optimal control: close monitoring, education of clients, avoidance of asthma triggers, and pharmacologic therapy.

Many women with asthma have positive skin tests to allergens, the most common being animal dander, dust mites, cockroach antigens, pollens, and molds. There are nonimmune triggers as well, including strong odors, tobacco smoke, air pollutants, and drugs such as aspirin and beta blockers. For exercise-triggered asthma, the use of a bronchodilator 5 to 60 minutes before exercise may reduce symptoms. Avoidance of these allergens and triggers can significantly reduce the need for medication and the occurrence of exacerbations during and after pregnancy. All women should be strongly encouraged to stop smoking, but especially those with asthma because they are at increased risk for worsening chronic and acute asthma sequelae.

Allergy injections may benefit those with allergies and asthma, called allergic asthma. Also called immunotherapy, allergy shots do not "cure" asthma in the manner in which an injection of, say, antibiotics might cure an infection. Instead, allergy shots work a bit more like a vaccine. Allergy injections for asthma actually contain a very small amount of an allergen (substance causing allergy). Over time, the dosage is increased. Exposure to progressive amounts of the allergen is likely to help the body develop a tolerance to it. If the allergen buildup is effective, the allergic reaction will become much less severe. Allergy injections can reduce the symptoms of allergies and prevent the development of asthma.

Medical therapy includes a stepwise approach in an attempt to use the least amount of medication necessary to control a woman's asthma and keep her severity in the mild range. Goals of therapy include having normal or near-normal pulmonary function and minimal or no chronic symptoms, exacerbations, or limitations on activities. The final goal is to minimize the adverse effects of treatment.

Inhaled corticosteroids are preferred for the management of all levels of persistent asthma in pregnancy. Corticosteroids are the most effective treatment for the airway inflammation of asthma and reduce the hyperresponsiveness of airways to allergens and triggers.

NAEPP (2012) recommends three specific drugs to be used during pregnancy to control asthma:

- Budesonide (inhaled corticosteroid)
- Albuterol (short-acting beta₂ agonist)
- Salmeterol (long-acting beta₂ agonist)

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Oral corticosteroids are not recommended for the treatment of asthma during pregnancy, but they can be used to treat severe asthma attacks during pregnancy (AAAAI, 2012). In addition, two prostaglandins (Hemabate and misoprostol [Cytotec]) used for treating postpartum hemorrhage and cervical ripening are contraindicated for clients with asthma due to the risk of bronchial spasm and bronchoconstriction (King & Brucker, 2011).

Nursing Assessment

Obtain a thorough history of the disease, including the woman's usual therapy and control measures. Question the woman about asthma triggers and strategies used to reduce exposure to them ([Box 20.2](#)). Review the client's medication therapy regimen.

BOX 20.2: COMMON ASTHMA TRIGGERS

- Smoke and chemical irritants
- Air pollution
- Dust mites
- Animal dander
- Seasonal changes with pollen, molds, and spores
- Upper respiratory infections
- Esophageal reflux
- Medications, such as aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs)
- Exercise
- Cold air
- Emotional stress

Adapted from American Academy of Allergy, Asthma & Immunology [AAAAI]. (2012). *Managing asthma during pregnancy*. The National Asthma Education Prevention Program. Retrieved from <http://www.aaaai.org/patients/topicofthefmonth/0506>; Gilbert, E. S. (2011). *Manual of high risk pregnancy and delivery* (5th ed.). St. Louis, MO: Mosby Elsevier; and March of Dimes (2011a). *Asthma*. Retrieved from http://www.marchofdimes.com/pregnancy/complications_asthma.html.

Auscultate the lungs and assess respiratory and heart rates. Include the rate, rhythm, and depth of respirations; skin color; blood pressure and pulse rate; and signs of fatigue. Clients with an acute asthma attack often present with wheezing, chest tightness, tachypnea, nonproductive coughing, shortness of breath, and dyspnea. Lung auscultation findings might include diffuse wheezes and rhonchi, bronchovesicular sounds, and a more prominent expiratory phase of respiration compared to the inspiratory phase (Mattson & Smith, 2011). If the pregnancy is far enough along, the fetal heart rate is measured and routine prenatal assessments (weight, blood pressure, fundal height, urine for protein) are completed.

Laboratory studies usually include a complete blood count with differential (to assess the degree of nonspecific inflammation and identify anemia) and pulmonary function tests (to assess the severity of an attack and to provide a baseline to evaluate the client's response to treatment).

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Nursing Management

Nursing management focuses on client education about the condition and the skills necessary to manage it: self-monitoring, correct use of inhalers, identifying and limiting exposure to asthma triggers, and following a long-term plan for managing asthma and for promptly handling signs and symptoms of worsening asthma. Client education fosters adherence to the treatment regimen, thereby promoting an optimal environment for fetal growth and development.

Client education should begin at the first prenatal visit. The importance of optimal asthma control and the risks of poor control for the woman and her fetus should be discussed early in pregnancy. Clients should be taught signs and symptoms, and which should be of concern, as well as who to contact in emergent situations. Women should be observed using their inhalers and correct use reinforced. Frank discussion about the importance of continuing asthma medications and the possible severe consequences for the woman and her fetus with discontinuation is vital.

Ensure that the woman understands drug actions and interactions, the uses and potential abuses of asthma medications, and the signs and symptoms that require medical evaluation. Reviewing potential perinatal complications with the woman is helpful in motivating her to adhere to the prescribed regimen. At each antepartum visit, reassess the efficacy of the treatment plan to determine whether adjustments are needed.

Taking control of asthma in pregnancy is the responsibility of the client along with her health care team. Providing the client with the knowledge and tools to monitor her condition, control triggers and her environment ([Teaching Guidelines 20.2](#)), and use medications to prevent acute exacerbations assist the client in taking control. Facilitating a partnership with the woman will improve perinatal outcomes.

Teaching Guidelines 20.2: TEACHING TO CONTROL ASTHMA LINKED TO ENVIRONMENTAL TRIGGERS

- Remove any carpeting in the house, especially the bedroom, to reduce dust mites.
- Use allergen-proof encasing on the mattress, box spring, and pillows.
- Wash all bedding in hot water.
- Remove dust collectors in house, such as stuffed animals, books, knickknacks.
- Avoid pets in the house to reduce exposure to pet dander.
- Use a high-efficiency particulate air-filtering system in the bedroom.
- Do not smoke, and avoid places where you can be exposed to passive cigarette smoke from others.
- Stay indoors and use air conditioning when the pollen or mold count is high or air quality is poor.
- Wear a covering over your nose and mouth when going outside in the cold weather.

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- Avoid exposure to persons with colds, flu, or viruses.

When teaching the pregnant woman with asthma, cover the following topics:

- Signs and symptoms of asthma progression and exacerbation
 - Importance and safety of medication to the fetus and to herself
 - Warning signs that indicate the need to contact the health care provider
 - Potential harm to the fetus and to herself by undertreatment or delay in seeking help
 - Prevention and avoidance of known triggers
 - Home use of metered-dose inhalers
 - Adverse effects of medications
- During labor, monitor the client's oxygenation saturation by pulse oximetry and provide pain management through epidural analgesia to reduce stress, which may trigger an acute attack. Continuously monitor the fetus for distress during labor and assess fetal heart rate patterns for hypoxia. Assess the newborn for signs and symptoms of hypoxia.
 - Nurses should instruct and strongly urge women to remain on asthma medications during pregnancy because one third of clients have worsening of their asthma, including those women with mild asthma. There are proven negative effects from exacerbations and poor control on pregnancy outcome, whereas there are clear benefits of good control. Client education about the importance of good asthma control is essential for improving pregnancy outcomes.
 - *Rose, the pregnant teenager described earlier, is concerned about passing her asthma on to her baby. What should the nurse discuss with her? What questions should the nurse ask to help in identifying triggers in Rose's environment to prevent future asthma attacks?*

- *Take Note!*

- Successful asthma management can reduce adverse perinatal outcomes: preeclampsia, preterm birth, and low birth weight.

- **Tuberculosis**

- Tuberculosis (TB) is known as the great masquerader and manifestation of the disease can be vague and widespread. It is a disease that has been around for years but never seems to go away completely. Globally, TB is second only to HIV/AIDS as a cause of illness and death in adults, accounting for over 9 million cases of active disease and 2 million deaths each year. Someone in the world is newly infected with TB every second. Overall, one third of the world's population is currently infected with TB (World Health Organization [WHO], 2012). Although it is not prevalent in the United States, a resurgence was noted starting in the mid-1980s secondary to the AIDS epidemic and immigration. Left undiagnosed and untreated, each person with active TB will infect on average between 10 and 15 people each year (WHO, 2012). The link between

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poverty and TB is strong. With the large numbers of immigrants coming to the United States, all nurses must be skilled in screening for and managing this condition.

- In many cultures the social consequences associated with the diagnosis of TB fall most heavily on women. Difficulties finding a marriage partner and divorce or abandonment among those already married are significant consequences for women from Pakistan, Vietnam, and India. Fear of social consequences can translate into delayed or absent health-seeking behavior. In pregnancy, TB that is treated early and adequately has outcomes equivalent to those in nonpregnant women. By contrast, studies have reported a fourfold increase in obstetrical mortality with increased incidence of spontaneous abortion and preeclampsia, and a ninefold increase in preterm labor in cases where TB was diagnosed late (Murthy & Smith, 2010).
- A person becomes infected by inhaling the infectious organism *Mycobacterium tuberculosis*, which is carried on droplet nuclei and spread by airborne transmission. The lung is the major site of involvement, but the lymph glands, meninges, bones, joints, and kidneys can become infected. Women can remain asymptomatic for long periods of time as the organism lies dormant. Pregnant women with untreated TB are more likely to have an underweight infant, an infant with a low Apgar score, and perinatal death (Mnyani & McIntyre, 2011). The newborn is at risk of postnatally acquired TB if the mother still has active TB at the time of birth. Therefore, prenatal diagnosis and effective treatment of the mother are essential.

• Therapeutic Management

- WHO recommends that the treatment of TB in pregnant women should be the same as that in nonpregnant women, and the rest of the general population the only exception being that streptomycin should be avoided in pregnancy because it is ototoxic to the fetus. The standard treatment is ethambutol, isoniazid, rifampicin, and pyrazinamide for 2 months—the intensive phase—followed by 4 months of isoniazid and rifampicin—the continuation phase (Mnyani & McIntyre, 2011). Medications are the cornerstone of treatment to prevent infection from progressing. The FDA developed five pregnancy categories that rank the risk of teratogenic effects of drugs to be used in drug labeling (see the list earlier in the chapter in the discussion of heart disease). The safety of the first-line drugs for the management of active TB in pregnancy has been established, and therapy improves both maternal and neonatal outcomes.

• Nursing Assessment

- Review the woman's history for risk factors such as immunocompromised status, recent immigration status, homelessness or overcrowded living conditions, and injectable drug use. Women emigrating from developing countries such as Latin America, Asia, the Indian subcontinent, Eastern Europe, Russia, China, Mexico, Haiti, and Africa with high rates of TB also are at risk.
- At antepartum visits, be alert for clinical manifestations of TB, including fatigue, fever or night sweats, nonproductive cough, weakness, slow weight loss, anemia, hemoptysis, and anorexia (Nhan-Chang & Jones, 2010). If TB is suspected or the woman is at risk for developing TB, anticipate screening with purified protein derivative (PPD) administered by intradermal

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injection. If the client has been exposed to TB, a reddened induration will appear within 72 hours. If the test is positive, anticipate a follow-up chest x-ray with lead shielding over the abdomen and sputum cultures to confirm the diagnosis.

• Nursing Management

- Compliance with the multidrug therapy is critical to protect the woman and her fetus from progression of TB. Provide education about the disease process, the mode of transmission, prevention, potential complications, and the importance of adhering to the treatment regimen.
- Stressing the importance of health promotion activities throughout the pregnancy is important. Some suggestions might include avoiding crowded living conditions, avoiding sick people, maintaining adequate hydration, eating a nutritious, well-balanced diet, keeping all prenatal appointments to evaluate fetal growth and well-being, and getting plenty of fresh air by going outside frequently. Determining the woman's understanding of her condition and treatment plan is important for compliance. A language interpreter may be needed to validate and reinforce her understanding if she does not speak English.
- Breast-feeding is not contraindicated during the medication regimen and should in fact be encouraged. Management of the newborn of a mother with TB involves preventing transmission by teaching the parents not to cough, sneeze, or talk directly into the newborn's face. Nurses need to stay current about new therapies and screening techniques to treat this centuries-old disease.

• HEMATOLOGIC CONDITIONS

- **Anemia**, a reduction in red blood cell volume, is measured by hematocrit (Hct) or a decrease in the concentration of hemoglobin (Hgb) in the peripheral blood. This results in reduced capacity of the blood to carry oxygen to the vital organs of the mother and fetus. Anemia is a sign of an underlying problem but does not indicate its origin.

• Iron-Deficiency Anemia

- Iron-deficiency anemia affects one in four pregnancies and is usually related to an inadequate dietary intake of iron (Curran, 2011). Iron-deficiency anemia accounts for 75% to 95% of the cases of anemia in pregnant women. A woman who is pregnant often has insufficient iron stores to meet the demands of pregnancy. A recent study found that it was also strongly associated with low socioeconomic status, which affected women's knowledge and health-seeking behaviors. The study concluded that empowering women in terms of education and economic status was the key factor in combating anemia in pregnancy to prevent the vicious cycle of associated problems (Noronha, Bhaduri, Bhat, & Kamath, 2010). The clinical consequences of iron-deficiency anemia include preterm delivery, perinatal mortality, and postpartum depression. Fetal and neonatal consequences include low birth weight and poor mental and psychomotor performance (Gilbert, 2011). With significant maternal iron depletion, the fetus will attempt to store iron, but at the cost to the mother. Anemia at term increases the perinatal

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risk for both the mother and newborn. The risks of hemorrhage (impaired platelet function) and infection during and after birth also are increased. Clinical symptoms of iron-deficiency anemia include fatigue, headache, restless legs syndrome, and pica eating behaviors.

• Therapeutic Management

- The goals of treatment for iron-deficiency anemia in pregnancy are to eliminate symptoms, correct the deficiency, and replenish iron stores. The Centers for Disease Control and Prevention (CDC), Institute of Medicine, and ACOG recommend routine iron supplementation for all pregnant women starting at a low dose of 30 mg/day beginning at the first prenatal visit (Goonewardene, Shehata, & Hamad 2012). Attempting to meet maternal iron requirements solely through diet in the face of diminished iron stores is difficult.

• Nursing Assessment

- Review the mother's history for factors that may contribute to the development of iron-deficiency anemia, including poor nutrition, hemolysis, **pica** (consuming nonfood substances), multiple gestation, limited intervals between pregnancies, and blood loss. Assess the woman's dietary intake as well as the quantity and timing of ingestion of substances that interfere with iron absorption, such as tea, coffee, chocolate, and high-fiber foods. Ask the woman if she has fatigue, weakness, malaise, anorexia, or increased susceptibility to infection, such as frequent colds. Inspect the skin and mucous membranes, noting any pallor. Obtain vital signs and report any tachycardia.
- Prepare the woman for laboratory testing. Laboratory tests usually reveal low Hgb (<11 g/dL), low Hct (<35%), low serum iron (<30 mcg/dL), microcytic and hypochromic cells, and low serum ferritin (<100 mg/dL).

Nursing Management

Nursing management of the woman with iron-deficiency anemia focuses on encouraging compliance with drug therapy and providing dietary instruction about the intake of foods high in iron. Although iron constitutes a minimal percentage of the body's total weight, it has several major roles: it assists in the transport of oxygen and carbon dioxide throughout the body, it aids in the production of red blood cells, and it plays a role in the body's immune response.

Stress the importance of taking the prenatal vitamin and iron supplement consistently. Encourage the woman to take the iron supplement with vitamin C-containing fluids such as orange juice, which will promote absorption, rather than milk, which can inhibit iron absorption. Taking iron on an empty stomach improves its absorption, but many women cannot tolerate the gastrointestinal discomfort it causes. In such cases, advise the woman to take it with meals. Instruct the woman about adverse effects, which are predominantly gastrointestinal and include gastric discomfort, nausea, vomiting,

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anorexia, diarrhea, metallic taste, and constipation. Suggest that the woman take the iron supplement with meals and increase her intake of fiber and fluids to help overcome the most common side effects.

Provide dietary counseling. Recommend foods high in iron, such as dried fruits, whole grains, green leafy vegetables, meats, peanut butter, and iron-fortified cereals (Dudek, 2010). Anticipate the need for a referral to a dietitian. **Teaching Guidelines 20.3** highlights instructions for the pregnant woman with iron-deficiency anemia.

Teaching Guidelines 20.3: TEACHING FOR THE WOMAN WITH IRON-DEFICIENCY ANEMIA

- Take your prenatal vitamin daily; if you miss a dose, take it as soon as you remember.
- For best absorption, take iron supplements between meals.
- Avoid taking iron supplements with coffee, tea, chocolate, and high-fiber food.
- Eat foods rich in iron, such as:
 - Meats, green leafy vegetables, legumes, dried fruits, whole grains
 - Peanut butter, bean dip, whole-wheat fortified breads and cereals
- For best iron absorption from foods, consume the food along with a food high in vitamin C.
- Increase your exercise, fluids, and high-fiber foods to reduce constipation.
- Plan frequent rest periods during the day.

Thalassemia

Thalassemia is a group of hereditary anemias in which synthesis of one or both chains of the hemoglobin molecule (alpha and beta) is defective. Inheritance is autosomal recessive. A low Hgb and a microcytic, hypochromic anemia results. The prevalence and severity of thalassemia depend on the woman's racial background: persons of Mediterranean, Asian, Italian, or Greek heritage and African Americans are most frequently affected. Beta-thalassemia is the most common form found in the United States (Curran, 2011).

Thalassemia occurs in two forms: alpha-thalassemia and beta-thalassemia. Alpha-thalassemia (minor), the heterozygous form, results from the inheritance of one abnormal gene from either parent, placing the offspring in a carrier trait state. These women have little or no hematologic disease and are clinically asymptomatic (silent carrier state). Beta-thalassemia (major) is the form involving inheritance of the gene from both parents. Beta-thalassemia major can be very severe. Genetic counseling might be necessary when decisions about childbearing are being made.

Thalassemia minor has little effect on the pregnancy, although the woman will have mild, persistent anemia. This anemia does not respond to iron therapy, and iron supplements should not be prescribed.

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Women with thalassemia major do not usually become pregnant because of lifelong severe hemolysis, anemia, and premature death (Protonotariou & Tolis, 2010).

Management of thalassemia during pregnancy depends on the severity of the disease. Identification and screening are important to plan care. The woman's ethnic background, medical history, and blood studies are analyzed. If the woman is determined to be a carrier, screening of the father of the child is indicated. Knowledge of the carrier state of each parent provides the genetic counselor with knowledge about the risk that the fetus will be a carrier or will have the disease (Curran, 2011).

Mild anemia may be present, and instructions to rest and avoid infections are helpful. Nurses should provide supportive care and expectant management throughout the pregnancy.

Sickle Cell Anemia

Sickle cell anemia is an autosomal recessive inherited condition that results from a defective hemoglobin molecule (hemoglobin S). It is found most commonly in African Americans, Southeast Asians, and Middle Eastern populations. Sickle cell disease affects millions of people across the globe. In the United States, approximately 70,000 to 100,000 people have the disease, and 2 million have the sickle cell trait. Sickle cell disease occurs once in every 500 African American births, and once in 36,000 Hispanic American births. One in 12 African Americans has the sickle cell trait. Women with sickle cell disease can have more adverse maternal outcomes such as preeclampsia, eclampsia, preterm labor, placental abruption, intrauterine growth restriction, and low birth weight (Macmullen & Dulski, 2011). The gene offers protection against malaria, but can be a cause of chronic pain and early death. Life expectancy is 48 years for females (Dauphin-McKenzie, Gilles, Jacques, & Harrington, 2010). People with only one gene for the trait (heterozygous) will have sickle cell trait without obvious symptoms of the disease and with little effect on the pregnancy.

Pathophysiology

In the human body, the hemoglobin molecule serves as the oxygen-carrying component of the red blood cells. Most people have several types of circulating hemoglobin (HbA and HbA₂) that make up the majority of their circulatory system. In sickle cell disease, the abnormal hemoglobin S (HbS) replaces HbA and HbA₂. This abnormal hemoglobin (HbS) becomes sickle shaped as a result of any stress or trauma such as infection, fever, acidosis, dehydration, physical exertion, excessive cold exposure, or hypoxia. Significant anemia results.

Sickle cell anemia during pregnancy is associated with more severe anemia and frequent vaso-occlusive crises, with increased maternal and perinatal morbidity and mortality. In pregnant women with sickle cell anemia, complications can occur at any time during gestation, labor and birth, or postpartum. This is believed to be secondary to hormonal modifications, hypercoagulable state, and increased susceptibility to infection. Microvascular sickling in the placental circulation is associated with miscarriages, placental abruption, preeclampsia, preterm labor, intrauterine growth restriction, fetal distress, and low birth weight (Rogers & Molokie, 2010).

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Therapeutic Management

Ideally, women with hemoglobinopathies are screened before conception and are made aware of the risks of sickle cell anemia to themselves and to the fetus. A blood hemoglobin electrophoresis is done for all women from high-risk ancestry at their first prenatal visit to determine the types and percentages of hemoglobin present. This information should help them in making reproductive decisions.

Treatment depends on the health status of the woman. The effect of sickle cell disease on pregnancy depends on which manifestations the woman is experiencing. For example, sickle cell anemia combined with the increased blood volume in pregnancy increases the risks for heart failure should fluid overload occur in therapy for the anemia (Macmullen & Dulski, 2011). Early and continuous prenatal care is needed to safeguard the fetus/infant from potential complications during the antepartum, intrapartum, and postpartum periods. Toward this end, prenatal visits for the first and second trimester should be scheduled more frequently. During pregnancy, only supportive therapy is used: blood transfusions for severe anemia, analgesics for pain, and antibiotics for infection.

Nursing Assessment

Assess the woman for signs and symptoms of sickle cell anemia. Ask the woman if she has anorexia, dyspnea, or malaise. Inspect the color of the skin and mucous membranes, noting any pallor. Be alert for indicators of sickle cell crisis, including severe abdominal pain, muscle spasms, leg pains, joint pain, fever, stiff neck, nausea and vomiting, and seizures (Curran, 2011).

Nursing Management

Clients require emotional support, education, and follow-up care to deal with this chronic condition, which can have a great impact on the woman and her family. Monitor vital signs, fetal heart rate, weight gain, and fetal growth. Assess hydration status at each visit and urge the client to drink 8 to 10 glasses of fluid daily to prevent dehydration. Teach the client about the need to avoid infections (including meticulous handwashing), cigarette smoking, alcohol consumption, and temperature extremes.

Assist the woman in scheduling frequent fetal well-being assessments, such as biophysical profiles, nonstress tests, and contraction stress tests, and monitor laboratory test results for changes. Throughout the antepartal period, be alert for early signs and symptoms of crisis.

During labor, encourage rest and provide pain management. Oxygen supplementation is typically used throughout labor, along with intravenous fluids to maintain hydration. The fetal heart rate is monitored closely. After giving birth, the woman is fitted with antiembolism stockings to prevent blood clot formation. Before discharge from the facility after birth of the newborn, discuss family planning options.

The ability to predict the clinical course of sickle cell anemia during pregnancy is difficult. Outcomes have improved for pregnant women with the disease, and now-a-days the majority can achieve a successful live birth. However, pregnancy is associated with an increased incidence of morbidity and

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mortality. Optimal management during pregnancy should be directed at preventing pain crises, chronic organ damage, and early mortality using a multidisciplinary team approach and prompt, effective, and safe relief of acute pain episodes. Although these measures do not remove the risk of maternal and fetal complications, they are thought to minimize them, promoting a successful pregnancy outcome. As part of the OB health care team, the nurse provides nursing interventions for the labor and postpartum client aimed at pain management, maternal/fetal safety, and client education. The overall objective is a healthy outcome for the childbearing family. The nurse has a vital role in making this happen.

AUTOIMMUNE DISORDERS

Autoimmune disorders are a group of more than 80 distinct diseases that emerge when the immune system launches an immune response against its own cells and tissues. Two distinct types of autoimmune disease occur:

- 1. Localized disorders target specific organs such as the thyroid gland in Hashimoto's thyroiditis and Graves' disease.
- 2. Systemic disorders affect multiple organs. For example, in systemic lupus erythematosus (SLE), the immune system can target the lungs, hearts, joints, kidneys, brain, and red blood cells.

Autoimmune disorders may cause mild insidious symptoms that come and go or debilitating conditions with high mortality.

Women suffer from autoimmune disease more than men. According to the CDC (2011h), autoimmune diseases affect approximately 8% of the population, 78% of whom are women. Autoimmune diseases are the third most common category of disease in the United States after cancer and heart disease; they affect approximately 5% to 8% of the population or 14 to 22 million people (CDC, 2011h). Years ago, the general advice to women with autoimmune diseases, especially SLE, multiple sclerosis, or rheumatoid syndromes, was to avoid pregnancy because there was a high risk of maternal and fetal morbidity and mortality. However, it is now clear that these risks can be reduced in general by avoiding pregnancy when the diseases are active and continuing appropriate medication to reduce the chances of disease flare during pregnancy.

Systemic Lupus Erythematosus

Lupus disease, also referred to as **systemic lupus erythematosus (SLE)**, is a chronic, relapsing autoimmune disease of the connective tissues that can affect various organs, such as the skin, joints, kidneys, and serosal membranes. Lupus disease is of unknown etiology, but it is thought to be a failure of the regulatory mechanisms of the autoimmune system. Several triggers that cause the disease to activate include estrogen; cigarette smoking; infections, especially Epstein-Barr virus; physical or psychologic stress; exposure to ultraviolet light; and pregnancy. Lupus symptoms may include swollen joints, extreme fatigue, oral ulcers, skin rashes, and sensitivity to sunlight (Madazli, Bulut, Erenel, Gezer, & Guralp, 2010). Lupus is a complex disorder characterized by periods of relative inactivity and periods of disease exacerbation (flare-ups).

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The overall incidence of lupus in the United States is 125 per 100,000 people. The peak onset occurs between ages 15 and 45 with over 80% of the cases being diagnosed in women who are in their childbearing years. SLE is more common among those of African American, Afro-Caribbean, Asian, Native American, and Hispanic descent (Schur & Bermas, 2010).

Pathophysiology

The autoimmune responses in SLE cause the body not to recognize "self" from "nonself," thus allowing antibodies to be formed that attack the body's own cells and proteins. This activity causes suppression of the body's normal immunity and damage to the body tissue. The autoimmune response may initially involve one organ or several. The most common organ systems involved are the cardiovascular, integumentary, musculoskeletal, and nervous systems and the kidneys and lungs. In pregnancy, inflammation of the connective tissue of the deciduas can result in placental implantation problems and poor functioning (Cohen, Berger, Steup-Beekman, Bloemenkamp, & Bajema, 2010).

A pregnancy with lupus is prone to complications, including flares of disease activity during pregnancy or in the postpartum period, preeclampsia, miscarriage, stillbirth, IUGR, and preterm birth. Active lupus nephritis poses the greatest risk. The recognition of a lupus flare during pregnancy may be difficult because the signs and symptoms may mimic those of normal pregnancy (Baer, Witter, & Petri, 2011).

Therapeutic Management

The focus of therapy is to control disease flare-ups, suppress symptoms, and prevent organ damage. Treatment decisions are based on severity of the condition and organ involvement. Treatment of SLE in pregnancy is generally limited to NSAIDs (e.g., ibuprofen [Advil]), prednisone (Deltasone), and an antimalarial agent, hydroxychloroquine (Plaquenil). During pregnancy in the woman with SLE, the goal is to keep drug therapy to a minimum (King & Brucker, 2011).

Nursing Assessment

The time at which the nurse comes in contact with the woman in her childbearing life cycle will determine the focus of the assessment. If the woman is considering pregnancy, it is recommended that she postpone conception until the disease has been stable or in remission for 6 months. Active disease at time of conception and history of renal disease increase the likelihood of a poor pregnancy outcome (Gilbert, 2011). In particular, if pregnancy is planned during periods of inactive or stable disease, the result often is giving birth to healthy full-term babies without increased risks of pregnancy complications. Nonetheless, pregnancies in most autoimmune diseases are still classified as high risk because of the potential for major complications. Preconception counseling should include the medical and obstetric risks of spontaneous abortion, stillbirth, fetal death, fetal growth restriction, preeclampsia, preterm labor, and neonatal death and the need for more frequent visits for monitoring her condition (Borchers, Naguwa, Keen, & Gershwin, 2010).

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If the woman is already pregnant when the nurse encounters her, the nurse needs to assess for the following:

- Duration and presence of SLE signs and symptoms (fatigue, fever, malaise, polyarthritis, skin rashes, and multiorgan involvement)
- Evidence of anemia, thrombocytopenia, and thrombophilias
- Underlying renal disease (check the urine for protein and specific gravity)
- Signs of flare-ups
- Abnormalities in laboratory tests
- Signs of infection (check at each prenatal visit especially UTIs and URIs since prednisone can mask signs of infection and lower resistance)
- Fetal well-being and growth (check using ultrasound, fundal height measurements, nonstress tests, and biophysical profiles)

Nursing Management

The nurse should discuss with the woman the importance of having good control over her SLE condition throughout the pregnancy. Discussions should focus on the effects of SLE during the pregnancy and possible risk for exacerbations. Emphasize the importance of frequent prenatal visits to detect early preeclampsia, preterm labor, or infections. Instruction should cover the implications and potential side effects of all drug therapies prescribed. Teach energy conservation techniques to prevent fatigue, signs and symptoms to report (extreme fatigue, edema, confusion, abdominal pain, weight loss, leg pain, anorexia), and the need for frequent and close monitoring for fetal well-being. After childbirth, a discussion of birth control and the effects of the various methods on the disease is essential. Referral to self-help groups and local and national SLE organizations is important for further education of the woman and her family.

SLE can greatly complicate a pregnancy if close supervision is not maintained. The keys to a successful outcome for the mother and her infant include an accurate assessment of the disease, the various systems involved, and vigilance during the pregnancy for disease progression, effects on the fetus, and development of complications. Nursing care should be directed at early detection of problematic signs and symptoms, education of the mother and family, careful evaluation of the fetal status, and providing support to assist the mother in strengthening her coping strategies.

Multiple Sclerosis

Multiple sclerosis (MS) is a chronic inflammatory, demyelinating autoimmune disorder of the central nervous system. The National Multiple Sclerosis Society (2011) estimates that approximately 400,000 people in the United States have MS. It is more commonly seen in women than in men, and the mean age of onset is 30 years. Globally, approximately 2.1 million are affected. There is no cure for the disease, and the disease usually becomes a chronic condition.

In the early, inflammatory course of MS, autoreactive T cells cross the blood–brain barrier, attacking myelin proteins and leading to inflammation and demyelination. As the inflammatory process continues,

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repeated injury results of the myelin membrane with progressive neurodegeneration. The pathologic hallmark of MS can be described as multicentric, multiphasic CNS inflammation with resultant demyelination (Desmazieres, Sol-Foulon & Lubetzki 2012).

Uncomplicated MS does not have adverse effects on fertility, labor, or birth. Rates of spontaneous abortion, congenital anomalies, and fetal mortality are no higher among women with MS when compared to women in the general population (Jalkanen, Alanen, & Airas, 2010). There is no indication that women with MS require different care or management during the labor and birth process. Pregnant women with MS tend to have fewer relapses during gestation with a subsequent increase in disease activity in the first 3 months postpartum. Breast-feeding does not seem to have an influence on severity or frequency of exacerbations (Moots, 2010). Breast-feeding should be encouraged as long as the woman is not being treated with disease-modifying agents.

The clinical presentation of MS can be similar to common pregnancy-related symptoms, especially fatigue, weakness, constipation, urinary frequency, balance problems, back pain, and visual changes. The similarity of the symptoms makes it difficult to attribute any symptoms that may develop during an established pregnancy to the disease process. These symptoms should be assessed carefully to assess MS exacerbations (Stuart & Bergstrom, 2011).

The focus of MS therapy is to prevent clinical relapse and postpone neurodegeneration and the subsequent disability. Current medications include anti-inflammatories, immunosuppressants, immunomodulators/biologic agents, and a variety of complementary alternative therapies such as vitamin/mineral supplementation, homeopathy, botanical products, and antioxidants. The complementary or alternative therapies have not been proven to reduce relapse rates or disease progression, but many MS sufferers turn to them (King & Brucker, 2011). Most medications used in MS treatment are not FDA approved during pregnancy, but many have been used and have not shown to have adverse effects.

Nursing care is similar to that outlined under SLE previously. The need for support at this life-changing time is crucial. Continuity of care, access to tailored information when requested by the woman or her family, and having a point of contact are all important aspects of nursing care.

Rheumatoid Arthritis

Rheumatoid arthritis (RA) is characterized by joint inflammation and progressive disability and is one of the most common chronic autoimmune disorders. It predominates in women, commonly affecting women of child-bearing age and may complicate pregnancy. RA primarily affects synovial joints and tissues of the hands and feet, but any joint can be involved. Over time, bone and cartilage are damaged by the chronic inflammation process, resulting in joint deformity and loss of function. Progression of the disease and ensuing disability is unpredictable.

Rheumatoid arthritis affects approximately 1% of adults worldwide. It is present in nearly all geographic areas and impacts all ethnic groups. The disease typically presents between 30 and 50 years of age and affects twice as many women as men (Lin, Chen, Lin, & Chen, 2010). The course of RA during pregnancy is usually benign. In about three fourths of pregnancies, the symptoms of the disease lessen. In these

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cases, most women experience relief in the first trimester that continues throughout the pregnancy. For many women with RA, pregnancy can provide a reprieve from long-term joint pain and inflammation, but others will not experience remission and will continue to need medication. RA does not adversely affect pregnancy outcome. With occasional exceptions, RA returns after the third to fourth month postpartum (Mitchell, Kaul, & Clowse, 2010).

Individuals with RA typically present with pain, swelling, and tenderness in joints; decreased mobility; and stiffness after periods of inactivity. Treatment of RA focuses on reducing joint inflammation, managing pain, and preventing joint destruction. The categories of medications used to accomplish this are NSAIDs, glucocorticoids, hydroxychloroquine, methotrexate, immunomodulators/biologic agents and complementary alternative therapies such as physical therapy, exercise, acupuncture, and joint splinting for pain relief. During pregnancy, medications are limited to hydroxychloroquine, glucocorticoids, and NSAIDs. Methotrexate is a FDA Pregnancy Category X drug and, therefore, is contraindicated during pregnancy (King & Brucker, 2011).

Nursing care should address the teratogenicity and adverse effects of some of the medications used to treat rheumatoid arthritis. Women with RA must be monitored closely following childbirth because most are likely to have arthritis flare-ups during the postpartum period. The general nursing care is similar to that outlined for the low-risk pregnant woman.

Nurses caring for women with any disability (physical or cognitive) in general need to provide level-appropriate education on all reproductive health issues and improved access to health care. The woman's specific disability, her resources, and her approach to pregnancy and childbirth all help shape her experience. The nurse can play a role in making her experience a positive, memorable time in her life. Care for the woman with a disability should be well planned and coordinated by ensuring all documentation of the woman's needs and concerns is readily available to all personnel involved in her care. All members of the health care team should be involved in the plan of care and kept up to date of any changes. It is essential that the nurse facilitate care to ensure continuity of care throughout the woman's pregnancy and childbirth experience (Lawler, 2011).

INFECTIONS

A wide variety of infections can affect the progression of pregnancy, possibly having a negative impact on the outcome. The effect of the infection depends on the timing and severity of the infection and the body systems involved. Common viral infections include cytomegalovirus, rubella, herpes simplex, hepatitis B, varicella, parvovirus B19, and several sexually transmitted infections (STIs; [Table 20.4](#)). Toxoplasmosis and group B streptococcus are common nonviral infections. Only the most common infections will be discussed here.

TABLE 20.4: SEXUALLY TRANSMITTED INFECTIONS AFFECTING PREGNANCY

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Infection/Organism	Effect on Pregnancy and Fetus/Newborn	Implications
Syphilis (<i>Treponema pallidum</i>)	Maternal infection increases risk of premature labor and birth. Newborn may be born with congenital syphilis—jaundice, rhinitis, anemia, IUGR, and CNS involvement.	All pregnant women should be screened for this STI and treated with benzathine penicillin G 2.4 million units IM to prevent placental transmission.
Gonorrhea (<i>Neisseria gonorrhoea</i>)	Majority of women are asymptomatic. It causes ophthalmia neonatorum in the newborn from birth through infected birth canal.	All pregnant women should be screened at first prenatal visit, with repeat screening in the third trimester. All newborns receive mandatory eye prophylaxis with tetracycline or erythromycin within the first hour of life. Mother is treated with ceftriaxone (Rocephin) 125 mg IM in single dose before going home.
Chlamydia (<i>Chlamydia trachomatis</i>)	Majority of women are asymptomatic. Infection is associated with infertility and ectopic pregnancy, spontaneous abortions, preterm labor, premature rupture of membranes, low birth weight, still-birth, and neonatal mortality. Infection is transmitted to newborn through vaginal birth. Neonate may develop conjunctivitis or pneumonia.	All pregnant women should be screened at first prenatal visit and treated with erythromycin.
Human papillomavirus (HPV)	Infection causes warts in the anogenital area, known as condylomata acuminata.	Warts are treated with trichloroacetic acid, liquid nitrogen, or laser therapy under colposcopy.

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Infection/Organism	Effect on Pregnancy and Fetus/Newborn	Implications
	<p>These warts may grow large enough to block a vaginal birth.</p> <p>Fetal exposure to HPV during birth is associated with laryngeal papillomas.</p>	<p>Two HPV vaccines have been FDA approved (Gardasil and Cervarix) against the viral types most likely to cause cervical cancer (types 16 and 18) and genital warts (types 6 and 11) has been licensed in the United States for girls and women 9 to 26 years old. The vaccines are 95% to 100% effective. The vaccines are now recommended for young boys also.</p>
Trichomonas (<i>Trichomonas vaginalis</i>)	<p>Infection produces itching and burning, dysuria, strawberry patches on cervix, and vaginal discharge.</p> <p>Infection is associated with premature rupture of membranes and preterm birth.</p>	<p>Treatment is with a single 2-g dose of metronidazole (Flagyl).</p>

Adapted from Centers for Disease Control and prevention [CDC]. (2012a). *Sexually transmitted diseases*. Retrieved from <http://www.cdc.gov/std>; and King, T. L., & Brucker, M. C. (2011). *Pharmacology for women's health*. Sudbury, MA: Jones & Bartlett.

Cytomegalovirus

Cytomegalovirus (CMV) is the most common congenital and perinatal viral infection in the world (Fig. 20.4). CMV is the leading cause of congenital infection, with morbidity and mortality at birth and sequelae. Each year approximately 1% to 7% of pregnant women acquire a primary CMV infection (Johnson, Anderson & Pass 2012). Of these, about 30% to 40% transmit the infection to their fetuses. The risk of serious fetal injury is greatest when maternal infection develops in the first trimester or early in the second trimester. Between 10% and 15% of congenitally infected infants are acutely symptomatic at birth and most of the survivors have serious long-term complications (Lazzarotto, Guerra, Gabrielli, Lanari, & Landini, 2011). It is a leading cause of hearing loss and intellectual disability in the United States. As a result of its substantial disease burden, congenital CMV is associated with an estimated \$1 billion to \$2 billion in direct economic costs each year. However, there has been limited progress in developing interventions to prevent or treat CMV infection (Stowell, Forlin-Passoni, & Cannon, 2010). Pregnant women acquire active disease primarily from sexual contact, blood transfusions, kissing, and contact with children in daycare centers. It can also be spread through vertical transmission from mother to child in utero (causing congenital CMV), during birth, or through breast-feeding. The virus can be found in virtually all body fluids.

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Prevalence rates in women in the United States range from 50% to 85% (Hoerst & Samson, 2012). In the United States, approximately 1 in 60 people undergo seroconversion each year. Although prevalent in the U.S. population, CMV is not easily transmitted from host to recipient. The incidence of primary CMV infection in pregnant women in the United States ranges from 1% to 3% (Hoerst & Samson, 2012). CMV infection during pregnancy may result in abortion, stillbirth, low birth weight, IUGR, microcephaly, deafness, blindness, intellectual disability, jaundice, or congenital or neonatal infection. The first or primary infection, if it occurs during pregnancy, is the most dangerous to the fetus: the fetus has a 30% to 40% chance of being infected.



FIGURE 20.4

Clinical appearance of infant with congenital CMV with stigmata of disease, including petechial rash, microcephaly, jaundice, and abnormal posture of upper extremities secondary to CNS damage.

There are three time periods during which mother-to-child transmission can occur: in utero, during birth, and after birth. However, permanent disability only occurs in association with in utero infection. Such disability can result from maternal infection during any point in the pregnancy, but more severe disabilities are usually associated with maternal infection during the first trimester.

Most women are asymptomatic and don't know they have been exposed to CMV. Symptoms of CMV in the fetus and newborn, known as cytomegalovirus inclusion disease, include hepatomegaly, thrombocytopenia, IUGR, jaundice, microcephaly, hearing loss, chorioretinitis, and intellectual disability

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(Hoerst & Samson, 2012). Prenatal screening for CMV infection is not routinely performed. Since there is no therapy to prevent or treat CMV infections, nurses are responsible for educating and supporting childbearing-age women at risk for CMV infection. Stressing the importance of good handwashing and the use of sound hygiene practices can help to reduce transmission of the virus. A few specific hygiene guidelines for pregnant women include the following:

- Wash hands frequently with soap and water, especially after diaper changes, feeding, wiping nose or drool, and handling children's toys.
- Do not share cups, plates, utensils, food, or toothbrushes.
- Do not share towels or washcloths.
- Do not put a child's pacifier in your mouth.
- Clean toys, countertops, and other surfaces that come in contact with children's urine or saliva.

Rubella

Rubella, commonly called German measles, is spread by droplets or through direct contact with a contaminated object. The risk of a pregnant woman transmitting this virus through the placenta to her fetus increases with earlier exposure to the virus. When infection occurs within the first month after conception, 50% of fetuses show signs of infection; in the second month following conception, 25% of fetuses will be infected; and in the third month, 10% of fetuses will be affected (Drutz, 2010).

Preconception care has been defined as a set of interventions designed to identify and modify risks to a woman's health or pregnancy outcome through prevention and management. This care should be provided any time any health care provider sees a reproductive age woman. Personal and family history, physical exam, laboratory screening, reproductive plan, nutrition, supplements, weight, exercise, vaccinations, and injury prevention should be reviewed in all women. Folic acid 400 micrograms per day, as well as proper diet and exercise, should be encouraged. 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 (Berghella, Buchanan, Pereira, & Baxter, 2010).

Education for primary prevention is key. Ideally, all women have been vaccinated and have adequate immunity against rubella. However, all women are still screened at their first prenatal visit to determine their status. A rubella antibody titer of 1:8 or greater proves evidence of immunity. Women who are not immune should be vaccinated during the immediate postpartum period so they will be immune before becoming pregnant again (CDC, 2011c). Nurses need to check the rubella immune status of all new mothers and should make sure all mothers with a titer of less than 1:8 are immunized prior to discharge after birth of the newborn.

Herpes Simplex Virus

Approximately 50 million people are infected with genital herpes in the United States, and 1.5 million new cases are diagnosed annually, including 1,500 newborns (Roett, Mayor, Uduhiri 2012). Despite

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strategies designed to prevent perinatal transmission, the number of cases of newborn herpes simplex virus (HSV) infection continues to rise, mirroring the rising prevalence of genital herpes infection in women of childbearing age ([Fig. 20.5](#)) (Urah, 2011).

FIGURE 20.5

Newborn with disseminated herpes simplex virus infection. Note the healing ulcerations on the abdomen of the infant. From Sweet RL, Gibbs RS. *Atlas of Infectious Diseases of the Female Genital Tract*. Philadelphia, PA: Lippincott Williams & Wilkins, 2005.

HSV is a DNA virus with two subtypes: HSV-1 and HSV-2. HSV-1 infections were traditionally associated with oral lesions (fever blisters), whereas HSV-2 infections occurred in the genital region. Currently, either type can be found in either location (Urah, 2011).

Infection occurs by direct contact of the skin or mucous membranes with an active lesion through such activities as kissing, sexual (vaginal, oral, anal) contact, or routine skin-to-skin contact. HSV is associated with infections of the genital tract that when acquired during pregnancy can result in severe systemic symptoms in the mother and significant morbidity and mortality in the newborn. In addition, it may cause spontaneous abortion, birth anomalies, IUGR, or preterm labor. A 50% mortality rate may occur if the neonatal exposure is with an active primary infection (Mattson & Smith, 2011). Once the virus enters the body, it never leaves.

Infants born to mothers with a primary HSV infection have a 30% to 50% risk of acquiring the infection via perinatal transmission near or during birth. Recurrent genital herpes simplex infections carry a 1% to 3% risk of neonatal infection if the recurrence occurs around the time of vaginal birth (March of Dimes, 2011b). About one in four pregnant women is infected with genital herpes, although most do not know it. Fortunately, only a small number pass the infection on to their newborns (March of Dimes, 2011b).

The greatest risk of transmission is when the mother develops a primary infection near term and it is not recognized. Most neonatal infections are acquired at or around the time of birth through either ascending infection after ruptured membranes or contact with the virus at the time of birth. The method and timing of birth in a woman with genital herpes are controversial. The CDC (2012b) recommends that in the absence of active lesions, a vaginal birth is acceptable, but if the woman has active herpetic lesions near or at term, a cesarean birth should be planned. All invasive procedures that might cause a break in the infant's skin should be avoided, such as artificial rupture of membranes, fetal scalp electrode, or forceps and vacuum extraction (Gilbert, 2011).

Management for the woman with genital herpes during pregnancy involves caring for her as well as reducing the risk of newborn herpes. No therapy can eradicate HSV, and this chronic infection is noted for its frequent asymptomatic viral shedding. Because the majority of newborn herpes cases result from perinatal transmission of the virus during vaginal birth, and because transmission can result in severe neurologic impairment or death, treatment of the mother with an antiviral agent such as acyclovir (Zovirax) must be started as soon as the culture comes back positive. Since the introduction of acyclovir, newer second-generation antivirals have been introduced (e.g., valacyclovir [Valtrex] and famciclovir [Famvir]) and are available (King &

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Brucker, 2011). Universal screening for herpes is not economically sound, so nurses need to remain knowledgeable about current practice to provide accurate and sensitive care to all women.

Hepatitis B Virus

Hepatitis B virus (HBV) is one of the most prevalent chronic diseases in the world. It has infected approximately 2 billion people worldwide, of whom more than 350 million are chronically infected. Life-threatening liver disease (cirrhosis, liver failure, and hepatocellular carcinoma) occurs in as many as 40% of people with hepatitis B. HBV infection causes about 5,000 deaths annually in the United States (Rustgi, Carriero, Bachtold, & Zeldin, 2010). HBV can be transmitted through contaminated blood, illicit drug use, and sexual contact. The virus is 100 times more infectious than HIV and, unlike HIV, it can live outside the body in dried blood for more than a week (Hoerst & Samson, 2012).

Sexual transmission accounts for most adult HBV infections in the United States. Acutely infected women develop hepatitis with anorexia, nausea, vomiting, fever, abdominal pain, and jaundice. In women with acute hepatitis B, vertical transmission occurs in approximately 10% of newborns when infection occurs in the first trimester and in 80% to 90% of newborns when acute infection occurs in the third trimester. Without intervention, 70% to 90% of infants born to women who are positive for hepatitis B will have chronic hepatitis B by 6 months of age (Sinha & Kumar, 2010).

In addition, hepatitis B infection during pregnancy is associated with an increased risk of preterm birth, fetal distress during labor, meconium peritonitis, low birth weight, and neonatal death. Newborns infected with HBV are likely to become chronic carriers of the virus, becoming reservoirs for continued infection in the population (CDC, 2011d). The fetus is at particular risk during birth because of the possible contact with contaminated blood at this time.

The CDC (2011d) recommends that all pregnant women should be tested for hepatitis B surface antigen (HBsAg) regardless of previous HBV vaccine or screening. Infants born to HBsAg-positive mothers should receive single-antigen HBV vaccine and hepatitis B immunoglobulin (HBIG) within 12 hours after birth. Completion of the vaccine schedule is recommended by HBV vaccination at 1 and 6 months (CDC, 2011d).

Nursing Assessment

Review the woman's history for factors placing her at high risk:

- History of sexually transmitted infections
- Household contacts with HBV-infected persons
- Employment as a health care worker
- Abuse of intravenous drugs
- Sex worker (prostitute)
- Foreign born
- Multiple sexual partners

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- Chinese, Southeast Asian, or African heritage
- Sexual partners who are HBV infected (CDC, 2011d)

At the first prenatal visit, all pregnant women should be screened for HbsAg via blood studies. Expect to repeat this screening later in pregnancy for women in high-risk groups (Hoerst & Samson, 2012).

Nursing Management

If a woman tests positive for HBV, expect to administer HBV immune globulin (HBIG, Hep-B-Gammagee). The newborn will also receive HBV vaccine (Recombivax-HB, Engerix-B) within 12 hours of birth. The second and third doses of the vaccine are given at 1 and 6 months of age (CDC, 2011d). The CDC recommends routine vaccination of all newborns.

Women who are HbsAg negative may be vaccinated safely during pregnancy. No current research supports the use of surgical births to reduce vertical transmission of HBV. Breast-feeding by mothers with chronic HBV infection does not increase the risk of viral transmission to their newborns. It is not a contraindication to breast-feeding (Jonas, 2010).

Client education related to prevention of HBV is essential. Teach the woman about safer sex practices, good handwashing techniques, and the use of standard precautions ([Teaching Guidelines 20.4](#)). Protection can be afforded with the highly effective hepatitis B vaccine.

Teaching Guidelines 20.4: TEACHING TO PREVENT HEPATITIS B VIRUS

- Abstain from alcohol.
- Avoid intravenous drug exposure or sharing of needles.
- Encourage all household contacts and sexual partners to be vaccinated.
- Receive immediate treatment for any STI.
- Know that your newborn will receive the hepatitis B vaccine soon after birth.
- Use good handwashing techniques at all times.
- Avoid contact with blood or body fluids.
- Use barrier methods such as condoms during sexual intercourse.
- Avoid sharing any personal items, such as razors, toothbrushes, or eating utensils.

Permanent remission of the disease even with treatment rarely occurs. Therefore, therapy is directed at long-term suppression of viral replication and prevention of end-stage liver disease. Urge the woman to consume a high-protein diet and avoid fatigue. A healthy lifestyle can help delay disease progression. Initiate an open discussion about the modes of transmission and use of condoms to prevent spread.

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Varicella Zoster Virus

Varicella zoster virus (VZV), a member of the herpesvirus family, is the virus that causes both varicella (chickenpox) and herpes zoster (shingles). Pregnant women are at risk for developing varicella when they come in close contact with children who have active infection. Maternal varicella can be transmitted to the fetus through the placenta, leading to congenital varicella syndrome, if the mother is infected during the first half of pregnancy, via an ascending infection during birth, or by direct contact with infectious lesions, leading to infection after birth. Varicella occurs in approximately 1 to 7 of 10,000 pregnancies (Anderson, 2011).

Congenital varicella syndrome can occur in newborns of mothers infected during early pregnancy. The vertical transmission rate is estimated to be between 2% and 10%. It is characterized by low birth weight, skin lesions in a dermatomal distribution, spontaneous abortion, chorioretinitis, cataracts, cutaneous scarring, limb hypoplasia, microcephaly, ocular abnormalities, intellectual disability, and early death (Marino et al., 2011).

Preconception counseling is important for preventing this condition. A major component of counseling involves determining the woman's varicella immunity. The vaccine is administered if needed. Varicella vaccine is a live attenuated viral vaccine. It should be administered to all adolescents and adults 13 years of age and older who do not have evidence of varicella immunity (King & Brucker, 2011). Provide education to women who work in occupations that increase the risk of exposure to the virus, such as daycare workers, teachers of young children, and staff caring for children in institutional settings.

Varicella during pregnancy can be associated with severe illnesses for both the mother and her newborn. If contracted in the first half of pregnancy, some pregnant women are at risk for developing varicella pneumonia, which may put them at risk of life-threatening ventilatory compromise and death. Risk of varicella pneumonia appears to increase during pregnancy (Lamont et al., 2011). If the mother develops varicella rashes close to her due date, generalized neonatal varicella leading to death in about 20% of cases can be expected (Anderson, 2011). Maternal infection is preventable by preconception vaccination.

Parvovirus B19

Parvovirus B19 infection occurs worldwide and is extremely common. The incidence of acute B19 infection in pregnancy is about 3%. Approximately 30% to 50% of pregnant women are not immune, and vertical transmission is common following maternal infection in pregnancy. Fetal infection may be associated with a normal outcome, but fetal death may also occur without ultrasound evidence of infectious sequelae (Feldman, Timms, & Borgida, 2010). Parvovirus B19 is a common, self-limiting benign childhood virus that causes erythema infectiosum, also known as fifth disease (referring to its "fifth place" in a list of common childhood infections). Approximately 65% of women of reproductive age have developed immunity to parvovirus B19 (Mattson & Smith, 2011).

Pathophysiology

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The infection is spread transplacentally, by the oropharyngeal route in casual contact, and through infected blood. Infection of the fetus occurs through transplacental passage of the virus. Acute infection in pregnancy can cause B19 infection in the fetus, leading to nonimmune fetal hydrops secondary to severe anemia or fetal loss, depending on the gestational age at the time of infection. The risk to the fetus is greatest when the woman is exposed and infected within the first 20 weeks of gestation. In addition to hydrops, other fetal effects of parvovirus include spontaneous abortion, congenital anomalies (CNS, craniofacial, and eye), and long-term effects such as hepatic insufficiency, myocarditis, and learning disabilities (Marino et al., 2011). Fetal infection with B19V is also associated with intrauterine fetal death, nonimmune hydrops fetalis, thrombocytopenia, myocarditis, and neurologic manifestations. Fetal infection can also remain clinically unrecognized (de Jong, Walther, Kroes, & Oepkes, 2011).

Therapeutic Management

Generally, a diagnosis of parvovirus is based on clinical symptoms and serologic antibody testing for parvovirus immunoglobulin G (IgG) and parvovirus immunoglobulin M (IgM). Parvovirus B19 infection is followed by life-long immunity, which is shown by positive serum B19 IgG. Pregnant women who have been exposed to or who develop symptoms of parvovirus B19 require assessment to determine whether they are susceptible to infection (nonimmune). If the woman is immune, she can be reassured that she will not develop infection and that the virus will not adversely affect her pregnancy. If she is nonimmune, then referral to a perinatologist is recommended and counseling regarding the risks of fetal transmission, fetal loss, and hydrops is necessary. Knowledge of how best to manage this infection during pregnancy lags behind our understanding of the potential adverse consequences.

Intrauterine B19 infection is a cause of fetal anemia, hydrops, and demise, and perhaps also of congenital anomalies. The best strategy for surveillance of the infected pregnant woman is serial ultrasounds for detection of hydropic changes and fetal anemia, and treatment for severe fetal anemia. Serial ultrasounds are advocated because the rates of fetal death and complications peak 4 to 6 weeks after exposure, but they can occur as late as 3 months following onset of symptoms. The infected newborn is assessed for any anomaly and followed for up to 6 years to identify any sequelae (Cennimo & Dieudonne, 2011).

Nursing Assessment

Review the mother's history for any risk factors. School-teachers, daycare workers, and women living with school-aged children are at highest risk for being seropositive for parvovirus B19, especially if a recent outbreak has occurred in those settings. Also assess the woman for specific signs and symptoms. The characteristic rash starts on the face with a "slapped-cheeks" appearance and is followed by a generalized maculopapular rash. Fever, arthralgia, and generalized malaise are usually present in the mother. Prepare the mother for antibody testing.

Nursing Management

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Prevention is the best strategy. Stress the need for handwashing after handling children; cleaning toys and surfaces that children have been in contact with; and avoiding the sharing of food and drinks. Screening for parvovirus B19 during early pregnancy may help in early diagnosis, but the cost effectiveness of a national screening program has not been accepted to date. The nurse can provide information regarding risk factors and potential complications if exposed and support the parent's decision.

Group B Streptococcus

Group B streptococcus (GBS) is a naturally occurring bacterium found in approximately 50% of healthy adults. Women who test positive for the GBS bacteria are considered carriers. Carrier status is transient and doesn't indicate illness. Approximately 25% of pregnant women carry GBS in the rectum or vagina, thus introducing the risk of colonization of the fetus during birth. GBS affects about 1 in every 2,000 newborns in the United States (March of Dimes, 2011c). Approximately 1 out of every 100 to 200 newborns born to mothers who carry GBS will develop signs and symptoms of GBS disease. Although GBS is rarely serious in adults, it can be life threatening to newborns. GBS is the most common cause of sepsis and meningitis in newborns and is a frequent cause of newborn pneumonia (Yun & Humza, 2011). Newborns with early-onset (within a week after birth) GBS infections may have pneumonia or sepsis, whereas late-onset (after the first week) infections often manifest with meningitis (CDC, 2011c).

Genital tract colonization poses the most serious threat to the newborn because of exposure during birth and to the mother because of ascending infection after the membranes rupture. GBS colonization in the mother is thought to cause chorioamnionitis, endometritis, and postpartum wound infection.

Therapeutic Management

Antibiotic therapy usually is effective in treating women with GBS infections of the urinary tract or uterus, or chorioamnionitis without any sequelae. According to the 2012c CDC guidelines, all pregnant women should be screened for GBS at 35 to 37 weeks' gestation and treated. Vaginal and rectal specimens are cultured for the presence of the bacterium. Women with positive cultures are treated with a penicillin-based anti-infective agent and also during labor.

Penicillin G is the treatment of choice for GBS infection because of its narrow spectrum. Alternative antibiotics can be prescribed for clients with a penicillin allergy. The drug is usually administered intravenously at least 4 hours before birth so that it can reach adequate levels in the serum and amniotic fluid to reduce the risk of newborn colonization. Close monitoring is required during the administration of intravenous antibiotics because severe allergic reactions can occur rapidly.

Nursing Assessment

Review the woman's prenatal history, asking about any previous infection. Determine if the woman's membranes have ruptured and the time of rupture. Rupture of amniotic membranes greater than 18 hours increases the risk for infection. Monitor the mother's vital signs, reporting any maternal fever

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greater than 100.4° F (38° C). Assess the woman for other risk factors for perinatal transmission of GBS, including previous colonization with GBS, low socioeconomic status, African American race, age less than 20 years, positive colonization at 35 to 37 weeks' gestation, GBS in urine sample, previous birth of GBS-positive newborn, preterm birth, and use of invasive obstetric procedures (March of Dimes, 2011c). Document this information to help prevent vertical transmission to the newborn.

Many women with GBS infection are asymptomatic, but they may have urinary tract infections, uterine infections, and chorioamnionitis.

Nursing Management

Nurses play major roles as educators and advocates for all women and newborns to reduce the incidence of GBS infections. Ensure that pregnant women between 35 and 37 weeks' gestation are screened for GBS infection during a prenatal visit. Record the results and notify the birth attendant if the woman has tested positive for GBS. During labor, be prepared to administer intravenous antibiotics to all women who are GBS positive.

Toxoplasmosis

Toxoplasmosis is a relatively widespread parasitic infection caused by a one-celled organism, *Toxoplasma gondii*. When a pregnant woman is exposed to this protozoan, the infection can pose serious risks to her fetus. Between 1 in 1,000 and 8,000 newborns are born infected with toxoplasmosis in the United States (Hokelek, 2011). It is transferred by hand to mouth after touching cat feces while changing the cat litter box or through gardening in contaminated soil. Consuming undercooked meat, such as pork, lamb, or venison, can also transmit this organism.

A pregnant woman who contracts toxoplasmosis for the first time has an approximately 40% chance of passing the infection to her fetus (March of Dimes, 2011h). Although the woman typically remains asymptomatic, transmission to her fetus can occur throughout pregnancy. A fetus that contracts congenital toxoplasmosis typically has a low birth weight, enlarged liver and spleen, chorioretinitis, jaundice, IUGR, hydrocephalus, microcephaly, neurologic damage, and anemia. Severity varies with gestational age; usually, the earlier the infection, the more severe the effects (Feldman et al., 2010).

Treatment of the woman during pregnancy to reduce the risk of congenital infection is a combination of pyrimethamine and sulfadiazine. Treatment with sulfonamides during pregnancy has been shown to reduce the risk of congenital infection.

Prevention is the key to managing this infection. Nurses play a key role in educating the woman about measures to prevent toxoplasmosis ([Teaching Guidelines 20.5](#)).

Teaching Guidelines 20.5: TEACHING TO PREVENT TOXOPLASMOSIS

- Avoid eating raw or undercooked meat, especially lamb or pork. Cook all meat to an internal temperature of 160° F (71° C) throughout.
- Clean cutting boards, work surfaces, and utensils with hot soapy water after contact with raw meat or unwashed fruits and vegetables.
- Peel or thoroughly wash all raw fruits and vegetables before eating them.
- Wash hands thoroughly with warm water and soap after handling raw meat.
- Avoid feeding the cat raw or undercooked meats.
- Avoid emptying or cleaning the cat's litter box. Have someone else do it daily.
- Keep the cat indoors to prevent it from hunting and eating birds or rodents.
- Avoid uncooked eggs and unpasteurized milk.
- Wear gardening gloves when in contact with outdoor soil.
- Avoid contact with children's sandboxes, because cats can use them as litter boxes.

Women Who Are HIV Positive

Human immunodeficiency virus (HIV) is a retrovirus that is transmitted by blood and body fluids. The number of people living with HIV infection in 2010 was estimated at nearly 50 million, including approximately 20 million women of childbearing age and 2.5 million children, most of whom acquired HIV from mother-to-child transmission. According to the most recent incidence estimates, approximately 56,000 persons have been infected with HIV annually during the past decade (CDC, 2011f).

Despite the revolutionary strides that have been made in treatment and detection and recent clinical advances and cautious optimism associated with combination therapies and vaccines, the number of individuals who are HIV positive continues to climb worldwide. Intensive efforts notwithstanding, no real "cure" can be seen on the horizon (Crowley et al., 2010). Also, despite dramatic reductions in perinatal transmission of HIV in the United States, barriers to prevention still exist and perinatal HIV infections continue.

Historically, HIV/AIDS was associated with the male homosexual community and intravenous drug users, but currently the prevalence of HIV/AIDS is now increasing more rapidly among women than men. Women are the fastest-growing segment of persons becoming infected with HIV; transmission in women occurs most frequently from sexual contact (64%) and from intravenous drug use (33%) (CDC, 2011f). Most women, a large number of whom are mothers, have acquired the disease through heterosexual contact. The risk of acquiring HIV through heterosexual contact is greater for women due to exposure to the higher viral concentration in semen. In addition, sexual intercourse may cause breaks in the vaginal lining, increasing the chances that the virus will enter the woman's body. Fifty percent of

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all HIV/AIDS cases worldwide occur in women. AIDS is the third leading cause of death among all U.S. women aged 25 to 44 years and the leading cause of death among African American women in this age group (CDC, 2011f).

Pathophysiology

The three recognized modes of HIV transmission are unprotected sexual intercourse with an infected partner, contact with infected blood or blood products, and perinatal transmission.

Take Note!

HIV is not transmitted by doorknobs, faucets, toilets, dirty dishes, mosquitoes, wet towels, coughing or sneezing, shaking hands, or being hugged or by any other indirect method.

The virus attacks the T4 cells, decreases the CD4 cell count, and disables the immune system. The HIV condition can progress to a severe immunosuppressed state termed **acquired immunodeficiency syndrome (AIDS)**. AIDS is a progressive, debilitating disease that suppresses cellular immunity, predisposing the infected person to opportunistic infections and malignancies. The CDC defines AIDS as an HIV-infected person with a specific opportunistic infection or a CD4 count of less than 200. Eventually, death occurs. The time from infection with HIV to development of AIDS is a median of 11 years but varies depending on whether the client is taking current antiretroviral therapy (Johnsen, 2012). Research indicates that pregnancy does not accelerate the progression of HIV to AIDS or death (Anderson 2012).

Once infected with HIV, the woman develops antibodies that can be detected with the enzyme-linked immunosorbent assay (ELISA) and confirmed with the Western blot test. Antibodies develop within 6 to 12 weeks after exposure, although this latent period is much longer in some women. [Table 20.5](#) highlights the four stages of HIV infection according to the CDC (2011f).

TABLE 20.5: STAGES OF HIV INFECTION OUTLINED BY THE CDC

Stages	Description	Clinical Picture
I	Acute infection	Early stage with pervasive viral production Flu-like symptoms 2–4 wks after exposure

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Stages	Description	Clinical Picture
		Signs and symptoms: weight loss, low-grade fever, fatigue, sore throat, night sweats, and myalgia
II	Asymptomatic infection	Viral replication continues within lymphatics Usually free of symptoms; lymphadenopathy
III	Persistent generalized lymphadenopathy	Possibly remaining in this stage for years; AIDS develops in most within 7–10 yr Opportunistic infections occur
IV	End-stage disease (AIDS)	Severe immune deficiency High viral load and low CD4 counts Signs and symptoms: bacterial, viral, or fungal opportunistic infections, fever, wasting syndrome, fatigue, neoplasms, and cognitive changes

Adapted from Centers for Disease Control and Prevention. (2011a). *Basic information about HIV and AIDS*. Retrieved from <http://www.cdc.gov/hiv/topics/basic/index.htm>.

Impact of HIV on Pregnancy

When a woman who is infected with HIV becomes pregnant, the risks to herself, her fetus, and the newborn are great. The risks are compounded by problems such as drug abuse, lack of access to prenatal care, poverty, poor nutrition, and high-risk behaviors such as unsafe sex practices and multiple sex partners, which can predispose the woman to additional STIs such as herpes, syphilis, or human papillomavirus (HPV). Additional risk factors to assess for include women who exchange sex for money or drugs or have sex partners who do; a woman whose past or present sex partners were HIV infected; and women who had a blood transfusion between 1978 and 1985. Early identification of maternal HIV seropositivity allows early antiretroviral treatment to prevent mother-to-child transmission, allows a provider to avoid obstetric practices that may increase the risk for transmission, and allows an opportunity to counsel the mother against breast-feeding (also known to increase the risk for transmission) (U.S. Preventive Services Task Force [USPSTF], 2011). Subsequently, pregnant women who are HIV positive are at risk for preterm delivery, premature rupture of membranes, intrapartum or postpartum hemorrhage, postpartum infection, poor wound healing, and genitourinary tract infections (CDC, 2011f).

Perinatal transmission of HIV (from the mother to the fetus or child) also can occur. However, such cases have decreased in the past several years in the United States, primarily due to the use of zidovudine

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(ZDV) therapy in pregnant women infected with HIV. This has not been the case in poor countries without similar resources. The Joint United Nations programs on HIV/AIDS (UNAIDS) estimates that over 700,000 new infections due to mother-to-child transmission occur annually. This number is expected to increase rapidly as the prevalence rises in Southeast Asia (Johnsen, 2012). Perinatal transmission rates are as high as 35% when there is no intervention (antiretroviral therapy) and below 2% when antiretroviral treatment and appropriate care are available. A recent Cochran meta-analysis review found that ZDV, nevirapine, and birth by elective cesarean section appear to be effective in decreasing the risk of mother-to-child transmission of HIV infection (Brocklehurst, 2011).

African American and Hispanic women make up 80% of HIV/AIDS cases among women and according to CDC data (2012b), at the end of 2009, 86% of prenatally infected children were African American or Hispanic. Lack of timely HIV testing during pregnancy is a major contributor to this outcome. Interventions are needed that will address knowledge barriers to HIV testing among African American and Hispanic women. Research has found that women who have information about methods to prevent perinatal HIV transmission and the importance of testing for the baby's or mother's health are more likely to be HIV tested. Media campaigns addressing the benefits of HIV testing may be a significant intervention. Media campaigns are not only successful in promoting HIV testing but, in populations with high HIV prevalence, they also are cost effective (Arya, Levison, & Giordano, 2010).

With perinatal transmission, approximately 25% to 50% of children manifest AIDS within the first year of life, and about 80% have clinical symptoms of the disease within 3 to 5 years (Johnsen, 2012). Breast-feeding is a major contributing factor for mother-to-child transmission, and the infected mother must be informed about this (March of Dimes, 2011d). The U.S. Public Health Service recommends that women who are HIV positive should avoid breast-feeding to prevent HIV transmission to the newborn. Given the devastating effects of HIV infection on children, preventing its transmission is critical (Bradley-Springer, Stevens, & Webb, 2010).

In addition to perinatal transmission, the fetus and newborn also are at risk for prematurity, IUGR, low birth weight, and infection. Prompt treatment with antiretroviral medications for the infant with an HIV infection may slow the progression of the disease.

Therapeutic Management

Women who are seropositive for HIV require counseling about the risk of perinatal transmission and the potential for obstetric complications. The risk of perinatal transmission directly correlates with the viral load (Johnsen, 2012). A discussion of the options on continuing the pregnancy, medication therapy, risks, perinatal outcomes, and treatment is warranted. Women who elect to continue with the pregnancy should be treated with antiretroviral therapy regardless of their CD4 count or viral load.

Drug therapy is the mainstay of treatment for pregnant women infected with HIV. The standard treatment is oral antiretroviral drugs given twice daily from 14 weeks' gestation until giving birth, intravenous administration during labor, and oral syrup for the newborn in the first 6 weeks of life (Hinova & Fernando, 2010). The goal of therapy is to reduce the viral load as much as possible, which reduces the risk of transmission to the fetus.

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Decisions about the birthing method to be used are made on an individual basis based on several factors involving the woman's health. Some reports suggest that cesarean birth may reduce the risk of HIV infection (Johnsen, 2012). Efforts to reduce instrumentation, such as avoiding the use of an episiotomy, fetal scalp electrodes, and fetal scalp sampling, will reduce the newborn's exposure to body fluids.

With appropriate therapies, the prognosis for pregnant women with HIV infection has improved significantly. In addition, the newborns of women with HIV infection who have received treatment usually do not become infected. Unfortunately, therapy is complicated and medications are expensive. Moreover, the medications are associated with numerous adverse effects and possible toxic reactions. These therapies offer a dual purpose: reduce the likelihood of mother-to-infant transmission and provide optimal suppression of the viral load in the mother. The core goal of all medical therapy is to bring the client's viral load to an undetectable level, thus minimizing the risk of transmission to the fetus and newborn.

Nursing Assessment

Nursing assessment begins with a thorough history and physical examination. In addition, the woman is offered screening for HIV antibodies. Screening and effective intervention for women who are HIV positive are essential components of prenatal services, which also include education, counseling, testing, treatment, and continued care.

Health History and Physical Examination

Review the woman's history for risk factors, such as unsafe sex practices, multiple sex partners, and injectable drug use. Also have the woman complete a risk assessment survey. In addition, question the woman about any flu-like symptoms such as a low-grade fever, fatigue, sore throat, night sweats, diarrhea, cough, skin lesions, or muscle pain.

Perform a complete physical examination. Obtain the woman's weight and determine if she has lost weight recently. Assess for signs and symptoms of STIs, such as vulvovaginal candidiasis, bacterial vaginosis, HSV, chancroid, CMV, or chlamydia because of the increased risk for STIs.

Take Note!

Women who request an HIV test despite reporting no individual risk factors should be considered at risk, since many are not likely to disclose their high-risk behaviors.

Laboratory and Diagnostic Testing

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The USPSTF (2011) recommends that all pregnant women be offered HIV antibody testing, regardless of their risk of infection, and that testing be done during the initial prenatal evaluation. Testing is essential because treatments are available that can reduce the likelihood of perinatal transmission and maintain the health of the woman.

Take Note!

Screening only women who are identified as high risk based on their histories is inadequate due to the prolonged latency period that can exist after exposure. Also, research indicating that treatment with antiretroviral agents could reduce vertical transmission from the infected mother to the newborn has dramatically increased the importance of HIV antibody screening in pregnancy.

Offer all women who are pregnant or planning a pregnancy HIV testing using ELISA. Prepare the woman with a reactive screening test for an additional test, such as the Western blot or an immunofluorescence assay. The Western blot is the confirmatory diagnostic test. A positive antibody test confirmed by a supplemental test indicates that the woman has been infected with HIV and can pass it on to others. HIV antibodies are detectable in at least 95% of women within 3 months after infection (Tung, Sangi-Haghpeykar, & Levison, 2010).

In addition to the usual screening tests done in normal pregnancy, additional testing for STIs may be necessary. Women infected with HIV have high rates of STIs, especially HPV, vulvovaginal candidiasis, bacterial vaginosis, syphilis, HSV, chancroid, CMV, gonorrhea, chlamydia, and hepatitis B (March of Dimes, 2011d).

Nursing Management

Women infected with HIV should have comprehensive prenatal care, which starts with pretest and post-test counseling. In pretest counseling, the client completes a risk assessment survey and the nurse explains the meaning of positive versus negative test results, obtains informed consent for HIV testing, and educates the woman on how to prevent HIV infection by changing lifestyle behaviors if needed. Post-test counseling includes informing the client of the test results, reviewing the meaning of the results again, and reinforcing safer sex guidelines. All pretest and post-test counseling should be documented in the client's chart.

Educating the Client

Pregnant clients are dealing with many issues at their first prenatal visit. The confirmation of pregnancy may be accompanied by feelings of joy, anxiety, depression, or other emotions. Simultaneously, the client is given many pamphlets and receives advice and counseling about

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many important health issues (e.g., nutrition, prenatal development, appointment schedules). This health teaching may be done while the woman feels excited, tired, and anxious. To expect women to understand detailed explanations of a complex disease entity (HIV/AIDS) too may be unrealistic. Determine the client's readiness for this discussion.

Identify the client's individual needs for teaching, emotional support, and physical care. Nurses need to approach education and counseling of HIV-positive pregnant women in a caring, sensitive manner. Address the following information:

- Infection control issues at home
- Safer sex precautions
- Stages of the HIV disease process and treatment for each stage
- Symptoms of opportunistic infections
- Preventive drug therapies for her unborn infant
- Avoidance of breast-feeding
- Referrals to community support, counseling, and financial aid
- Client's support system and potential caretaker
- Importance of continual prenatal care
- Need for a well-balanced diet
- Measures to reduce exposure to infections

Be knowledgeable about HIV infection and how HIV is transmitted and share this knowledge with all women. Nurses also can work to influence legislators, public health officials, and the entire health establishment toward policies to address the HIV epidemic. Research toward treatment and cure is tremendously important, but the major key to prevention of the spread of the virus is education. Nurses play a major role in this education.

Supporting the Client

Be aware of the psychosocial sequelae of HIV/AIDS. A diagnosis of HIV can put a woman into an emotional tailspin, where she is worried about her own health and that of her unborn infant. She may experience grief, fear, or anxiety about the future of her children. Along with the medications that are so important to her health maintenance, address the woman's mental health needs, family dynamics, capacity to work, and social concerns and provide appropriate support and guidance.

Be aware of your personal beliefs and attitudes toward women who are HIV positive or have AIDS. Incorporate this awareness in your actions as you help the woman face the reality of the diagnosis and treatment options. Empathy, understanding, caring, and assistance are key to helping the client and her family.

Preparing for Labor, Birth, and Afterward

Current evidence suggests that cesarean birth performed before the onset of labor and before the rupture of membranes significantly reduces the rate of perinatal transmission. ACOG recommends that HIV-positive women be offered elective cesarean birth to reduce the rate of

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transmission beyond that which may be achieved through antiretroviral therapy. They further suggest that operative births be performed at 38 weeks' gestation and that amniocentesis be avoided to prevent contamination of the amniotic fluid with maternal blood. Decisions concerning the method of delivery should be based on the woman's viral load, the duration of ruptured membranes, the progress of labor, and other pertinent clinical factors (USPSTF, 2011).

Prepare the woman physically and emotionally for the possibility of cesarean birth and assist as necessary. Ensure that she understands the rationale for the surgical birth.

After the birth of the newborn, the motivation for taking antiretroviral medications may be lower, thus affecting the woman's compliance with therapy. Encourage the woman to continue therapy for her own sake as well as that of the newborn. Nurses can make a difference in helping women to adhere to their complex drug regimens.

Reinforce family planning methods during this time, incorporating a realistic view of her disease status. It is clear that hormonal contraceptives are not protective against HIV infection and that dual protection with condoms should be the goal for women using hormonal contraception (Blish & Baeten, 2011). Advise the woman that breast-feeding is not recommended. Instruct the woman who is HIV positive in self-care measures, including the proper method for disposing of perineal pads to reduce the risk of exposing others to infected body fluids. Finally, teach her the signs and symptoms of infection in newborns and infants, encouraging her to report any to the health care provider.

The evolution of HIV infection into a chronic disease has implications across all clinical care settings. Every nurse should be knowledgeable about the prevention, testing, treatment, and chronicity of the disease in order to provide high-quality care to people with or at risk for HIV. Nurses, therefore, need to have an understanding of the changing epidemiology of the disease, the most recent testing recommendations, developments in screening technology, the implications of aging with HIV infection, and the nursing implications of this ongoing epidemic.

Take Note!

When providing direct care, **ALWAYS** follow standard precautions.

VULNERABLE POPULATIONS

Every year there are an estimated 208 million pregnancies worldwide, with about 6.7 million of them in the United States (Alan Guttmacher Institute, 2012b). Each pregnancy runs the risk of an adverse outcome for the mother and the baby, but risks are dramatically increased for certain vulnerable populations: adolescents, women over the age of 35, women who are obese, and women who abuse

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substances. Although risks cannot be totally eliminated once pregnancy has begun, they can be reduced through appropriate and timely interventions.

Every woman's experience with pregnancy is unique and personal. The circumstances each one faces and what pregnancy means to her involve emotions and experiences that belong solely to her. Many women in these special population groups go through this experience in confusion and isolation, feeling desperately in need of help but not knowing where to go. Although all pregnant women experience these emotions to a certain extent, they are heightened in women who have numerous psychosocial issues. Pregnancy is a stressful time. Pregnant women face wide-ranging changes in their lives, relationships, and bodies as they move toward parenthood. These changes can be challenging for a woman without any additional stresses but are even more so in the face of age extremes, illness, or substance abuse.

Skilled nursing interventions are essential to promote the best outcome for the client and her baby. Timely support and appropriate interventions during the perinatal period can have long-standing implications for the mother and her newborn, ultimately with the goal of stability and integration of the family as a unit.

Pregnant Adolescent

Adolescence lasts from the onset of puberty to the cessation of physical growth, roughly from 11 to 19 years of age. Adolescents vacillate between being children and being adults. They need to adjust to the physiologic changes their bodies are undergoing and establish a sexual identity during this time. They search for personal identity and desire freedom and independence of thought and action. However, they continue to have a strong dependence on their parents (Broussard & Broussard, 2010).

Each year, almost 750,000 U.S. women aged 15 to 19 become pregnant. Two thirds of all teen pregnancies occur among 18- to 19-year-olds. These pregnancies, which account for 10% of all births, are typically unintended and occur outside of marriage. Eighty-two percent of teen pregnancies are unplanned; teens account for about one fifth of all unintended pregnancies annually (Alan Guttmacher Institute, 2012a). In addition, about half of all teen pregnancies occur within 6 months of first having sexual intercourse. About one in four teen mothers under age 18 have a second baby within 2 years after the birth of their first baby. Most of these girls are unmarried, and many are not ready for the emotional, psychological, and financial responsibilities of parenthood. Teens are least likely of all maternal age groups to get early and regular prenatal care (March of Dimes, 2011g). Adolescent pregnancy is further complicated by the adolescent's lack of financial resources: the income of teen mothers is half that of women who have given birth in their 20s (March of Dimes, 2011g).

Although the incidence of teenage pregnancy has steadily declined since the early 1990s, it continues to be higher in the United States than in any other industrialized country (Alan Guttmacher Institute, 2012a). Even this reduced incidence represents what is considered an unacceptably high level of pregnancy in an age group that is likely to suffer the social consequences of early pregnancy most. Even though teen birth rates in the United States have declined, they remain high, especially among Black and

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Hispanic teens and in southern states. The Latina teen birth rate is the highest of any ethnic group in the United States.

Currently, fewer high school students are having sexual intercourse, and more sexually active students are using some method of contraception. However, many teens who have had sexual intercourse have not spoken with their parents about sex, and use of contraceptives remains rare (CDC, 2011g). Subsequently, adolescent pregnancy is considered a major health problem and is addressed in *Healthy People 2020*.

Impact of Pregnancy in Adolescence

The impact of adolescent pregnancy is evident in maternal and perinatal morbidity and mortality. Nonetheless, in addition to the age involved in precocious pregnancy, it also reflects previous conditions such as malnutrition, infectious diseases, and deficiencies in the health care given to pregnant adolescents. The most important impact lies in the psychosocial area: it contributes to a loss of self-esteem, a destruction of life projects, and the maintenance of the circle of poverty (Molina, Roca, Zamorano, & Araya, 2010).

20-2: HEALTHY PEOPLE 2020

Objective	Nursing Significance
FP-8 Reduce pregnancy rates among adolescent females by 10 percent by 2020.	Will help to foster a continued decline in adolescent pregnancy rates by focusing on interventions related to pregnancy prevention, including safe sex practices and teaching about the complications associated with adolescent pregnancy.
FP-9 Increase the proportion of adolescents ages 17 years and under who have never had sexual intercourse by 10 percent by 2020.	
FP-10 Increase the proportion of sexually active persons ages 15 to 19 years who use condoms to both effectively prevent pregnancy and provide barrier protection against disease by 10 percent by 2020.	
FP-11 Increase the proportion of sexually active persons ages 15 to 19 years who use condoms and hormonal or intrauterine contraception to both effectively prevent pregnancy and provide barrier protection against disease by 10 percent by 2020.	

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Objective	Nursing Significance
FP-12 Increase the proportion of adolescents who received formal instruction on reproductive health topics before they were 18 years old by 10 percent by 2020.	
FP-13 Increase the proportion of adolescents who talked to a parent or guardian about reproductive health topics before they were 18 years old by 10 percent by 2020.	
HIV-8 Reduce the number of perinatally acquired HIV and AIDS cases by 10 percent by 2020.	Education for the pregnant mothers about the need and rationale for antiretroviral drug therapy to prevent vertical transmission of HIV to their fetus will help reduce this incidence.
MICH-11 Increase abstinence from alcohol, cigarettes, and illicit drugs among pregnant women by 10 percent by 2020.	Education and support offered to pregnant women regarding the hazards of alcohol, cigarettes, and illicit drugs will reduce the abuse of these substances to enhance the perinatal outcomes.
MICH-25 Reduce the occurrence of fetal alcohol syndrome (FAS) by 10 percent by 2020.	
NWS-22 Reduce iron deficiency among pregnant females.	Providing nutritional instruction on iron-rich foods will help reduce the incidence of iron deficiency anemia during pregnancy.

Healthy People objectives based on data from <http://www.healthypeople.gov>.

Adolescents are a unique group with special needs related to their stage of development. Adolescent pregnancy can be an emotionally charged situation, laden with ethical dilemmas and decisions. Topics such as abstinence, safer sex, abortion, and the decision to have a child are sensitive issues.

Adolescent pregnancy is an area when a nurse's moral convictions may influence the care that he or she provides to clients. Nurses need to examine their own beliefs about teen sexuality to identify personal assumptions. Putting aside one's moral convictions may be difficult, but it is necessary when working with pregnant adolescents. To be effective, health care providers must be able to communicate with adolescents in a manner they can understand and respect them as individuals.

The idea of it taking "a village to raise a child," as suggested by former First Lady Hillary Clinton in 1996, is perhaps even more valid than previously thought regarding teen pregnancy. The evidence suggests that it's not enough to teach teens to "just say no," nor is it enough to give them information about

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contraceptive methods; teens need to be connected to their parents, their peers, and their community (Katz, 2011). Nurses should feel that there is always hope and the chance of positive outcomes; nurses see that each and every day, often in the faces of their youngest clients. Nurses have to believe in that and work toward '*connecting*' with their teen clients.

Developmental Issues

An adolescent must accomplish certain developmental tasks to advance to the next stage of maturity. These developmental tasks include:

- Seeking economic and social stability
- Developing a personal value system
- Building meaningful relationships with others ([Fig. 20.6](#))



• FIGURE 20.6

Adolescent girls sharing time together.

- Becoming comfortable with their changing bodies
- Working to become independent from their parents
- Learning to verbalize conceptually (Herrman, 2010)

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Adolescents have special needs when working to accomplish their developmental tasks and making a smooth transition to young adulthood. One of the biggest areas of need is sexual health. Adolescents commonly lack the information, skills, and services necessary to make informed choices related to their sexual and reproductive health. Developmentally, adolescents are trying to figure out who they are and how they fit into society. As adolescents mature, their parents become less influential and peers become more influential. Peer pressure can lead adolescents to participate in sexual activity, as can the typical adolescent's belief that "it won't happen to me" ([Box 20.3](#)).

BOX 20.3: POSSIBLE FACTORS CONTRIBUTING TO ADOLESCENT PREGNANCY

- Early menarche
- Peer pressure to become sexually active
- Sexual or other abuse as a child
- Lack of accurate contraceptive information
- Fear of telling parents about sexual activity
- Feelings of invulnerability
- Poverty (85% of births occur in poor families)
- Culture or ethnicity (high incidence in Hispanic and African American girls)
- Unprotected sex
- Low self-esteem and inability to negotiate
- Lack of appropriate role models
- Strong need for someone to love
- Drug use, truancy from school, or other behavioral problems
- Wish to escape a bad home situation
- Early dating without supervision

Adapted from Alan Guttmacher Institute. (2012a). *Facts on American teens' sexual and reproductive health*. Retrieved from <http://www.guttmacher.org/pubs/FB-ATSRH.html>; Katz, A. (2011). Adolescent pregnancy. *Nursing for Women's Health*, 15(2), 149–152; and March of Dimes (2011g). *Teenage pregnancy*. Retrieved from http://www.marchofdimes.com/professionals/14332_1159.asp.

As a result, unplanned pregnancies occur. Work on the developmental tasks of adolescence, especially identity, can be interrupted as the adolescent attempts to integrate the tasks of pregnancy, bonding, and preparing to care for another with the tasks of developing self-identity and independence. A pregnant adolescent must try to meet her own needs along with those of her fetus. The process of learning how to separate from the parents while learning how to bond and attach to a newborn brings conflict and stress. A pregnancy can exacerbate an adolescent's feeling of loss of control and helplessness (Riesch, Anderson, Pridham, Lutz, & Becker, 2010).

Health and Social Issues

Adolescent pregnancy has a negative impact in terms of both health and social consequences. For example, 7 out of 10 adolescents will drop out of school. More than 75% will receive public assistance

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within 5 years of having their first child. In addition, children of adolescent mothers are at greater risk of preterm birth, low birth weight, child abuse, neglect, poverty, and death. The younger the adolescent is at the time of the first pregnancy, the more likely it is that she will have another pregnancy during her teens (March of Dimes, 2011g). Adolescent pregnancy also places them at high risk for obstetric complications such as preterm labor and births; low-birth-weight infants; sexually transmitted infections; preeclampsia, iron-deficiency anemia, poor eating habits, and inadequate nutrition and postpartum depression (Aruda, Waddicor, Frese, Cole, & Burke, 2010).

The psychosocial risks associated with early child-bearing often have an even greater impact on mothers, families, and society than the obstetric or medical risks (Whiteley & Brown, 2010). Pregnant adolescents experience higher rates of domestic violence and substance abuse. Those experiencing abuse are more likely to abuse substances, receive inadequate prenatal care, and have lower pregnancy weight compared with those who are not (Mander, 2010). Moreover, substance abuse (cigarettes, alcohol, or illicit drugs) can contribute to low birth weight, IUGR, preterm births, newborn addiction, and sepsis (March of Dimes, 2011g).

Although early childbearing (12 to 19 years of age) occurs in all socioeconomic groups, it is more prevalent among poor women and those from minority backgrounds, who face more obstetric and newborn risks than their more affluent counterparts (March of Dimes, 2011g). Poverty often contributes to delayed prenatal care and medical complications related to poor nutrition, such as anemia.

The financial burden of adolescent pregnancy is high and costs taxpayers an estimated \$11 billion annually in the United States (Alan Guttmacher Institute, 2012a). Much of the expense stems from Medicaid, food stamps, state health department maternity clinics, the federal Aid to Families with Dependent Children program, and direct payments to health care providers. However, this amount does not address the costs to society in terms of the loss of human resources and the far-reaching intergenerational effects of adolescent parenting.

For some adolescents, pregnancy may be seen as a hopeless situation: a grim story of poverty and lost dreams, of being trapped in a life that was never wanted. Health-related behaviors, such as smoking, diet, sexual behavior, and help-seeking behaviors, which are developed during adolescence often endure into later life (Herrman, 2010). The consequences associated with an adolescent's less-than-optimal health status at this age due to pregnancy can ultimately affect her long-term health and that of her children.

However, some adolescents can create a happy, stable life for themselves and their children by facing their challenges and working hard to beat the odds.

Recall Rose, the pregnant teenager with asthma. What issues would be important for the nurse to discuss with her related to her pregnancy, her asthma, and her age?

Nursing Assessment

Assessment of the pregnant adolescent is the same as that for any pregnant woman. However, when dealing with pregnant teens, the nurse also needs to ask:

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- How does the girl see herself in the future?
- Are realistic role models available to her?
- How much does she know about child development?
- What financial resources are available to her?
- Does she work? Does she go to school?
- What emotional support is available to her?
- Can she resolve conflicts and manage anger?
- What does she know about health and nutrition for herself and her child?
- Will she need help dealing with the challenges of the new parenting role?
- Does she need information about community resources?

Having an honest regard for adolescents requires getting to know them and being able to appreciate the important aspects of their life. Doing so forms a basis for the nurse's clinical judgment and promotes care that takes into account the concerns and practical circumstances of the teen and her family. Skillful practice includes knowing how and when to advise a teen and when to listen and refrain from giving advice. Giving advice can be misinterpreted as "preaching," and the adolescent will probably ignore the information. The nurse must be perceptive, flexible, and sensitive and must work to establish a therapeutic relationship.

Nursing Management

For adolescents, as for all women, pregnancy can be a physically, emotionally, and socially stressful time. The pregnancy is often both the result of and cause of social problems and stressors that can be overwhelming to them. Nurses must support adolescents during the transition from childhood into adulthood, which is complicated by their emergence into motherhood. Assist the adolescent in identifying family and friends who want to be involved and provide support throughout the pregnancy.

Help the adolescent identify the options for this pregnancy, such as abortion, self-parenting of the child, temporary foster care for the baby or herself, or placement of the child for adoption. Explore with the adolescent why she became pregnant. Becoming aware of why she decided to have a child is necessary to help with the development of the adolescent and her ability to parent. Identify barriers to seeking prenatal care, such as lack of transportation, too many problems at home, financial concerns, the long wait for an appointment, and lack of sensitivity on the part of the health care system. Encourage the girl to set goals and work toward them. Assist her in returning to school and furthering her education. As appropriate, initiate a referral for career or job counseling.

Stress that the girl's physical well-being is important for both her and her developing fetus, which depends on her for its own health-related needs. Assist with arrangements for care, including stress management and self-care.

Having a healthy newborn eases the transition to motherhood somewhat, rather than having to deal with the added stress of caring for an unhealthy baby (Heavey, 2010). Monitor weight gain, sleep and rest patterns, and nutritional status to promote positive outcomes for both mother and child. Stress the importance of attending prenatal education classes. Provide appropriate teaching based on the adolescent's developmental level and emphasize the importance of continued prenatal and follow-up care. Monitor maternal and fetal well-being throughout pregnancy and labor ([Fig. 20.7](#)).



FIGURE 20.7

A pregnant adolescent receiving care during labor.

Nurses can also play a major role in preventing adolescent pregnancies, perhaps by volunteering to talk to teen groups. [Teaching Guidelines 20.6](#) highlights the key areas for teaching adolescents about pregnancy prevention.

Teaching Guidelines 20.6: TOPICS FOR TEACHING ADOLESCENTS TO PREVENT PREGNANCY

- High-risk behaviors that lead to pregnancy
- Involvement in programs such as Free Teens, Teen Advisors, or Postponing Sexual Involvement
- Planning and goal setting to visualize their futures in terms of career, college, travel, and education
- Choice of abstinence or taking a step back to become a “second-time virgin”

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- Discussions about sexuality with a wiser adult—someone they respect can help put things in perspective
- Protection against sexually transmitted infections and pregnancy if they choose to remain sexually active
- Critical observation and review of peers and friends to make sure they are creating the right atmosphere for friendship
- Empowerment to make choices that will shape their life for years to come, including getting control of their own lives now
- Appropriate use of recreational time, such as sports, drama, volunteer work, music, jobs, church activities, and school clubs

Adapted from Katz, A. (2011). Adolescent pregnancy. *Nursing for Women's Health*, 15(2), 149–152; and March of Dimes (2011g). *Teenage pregnancy*. Retrieved from http://www.marchofdimes.com/professionals/14332_1159.asp.

Tackling the many issues surrounding adolescent pregnancy is difficult. Making connections with clients is crucial regardless of how complex their situation is. The future challenges nurses to find solutions to teenage pregnancies. Nurses must take proactive positions while working with adolescents, parents, schools, and communities to reduce the problems associated with early childbearing.

Nurses who provide care to adolescents have an opportunity to discuss future pregnancies and to use health care visits to teach about preconception health. Teaching adolescents who both express a desire for pregnancy and those who do not express such a desire is an important part of comprehensive nursing care. Teens require thorough teaching about health care risks such as smoking cessation, body weight control, interpersonal violence, and the need for folic acid. Adolescents should be prime recipients of preconception education at every health care visit.

Teen childbearing is associated with adverse consequences for mothers and their children and imposes high public sector costs. Prevention of teen pregnancy requires evidence-based sex education, support for parents in talking with their children about pregnancy prevention and other aspects of sexual and reproductive health, and ready access to effective and affordable contraception for teens who are sexually active (CDC, 2011g).

The Pregnant Woman Over Age 35

The term *elderly primip* is used to describe women aged 35 or older who are pregnant for the first time. A few decades ago, a woman having a baby after the age of 35 probably was giving birth to the last of several children, but today she may be having her first. With advances in technology and the tendency of women to seek career advancement prior to childbearing, the dramatic increase in women having first pregnancies after the age of 35 will likely continue.

Impact of Pregnancy on the Older Woman

Whether childbearing is delayed by choice or by chance, women starting a family at age 35 or older are not doing so without risk. Women in this age group may already have chronic health conditions that can

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put the pregnancy at risk. In addition, numerous studies have shown that increasing maternal age is a risk factor for infertility and spontaneous abortions, gestational diabetes, chronic hypertension, preeclampsia, preterm labor and birth, multiple pregnancy, genetic disorders and chromosomal abnormalities, placenta previa, IUGR, low Apgar scores, and surgical births (Bayrampour & Heaman, 2010). However, even though increased age implies increased complications, most women today who become pregnant after age 35 have healthy pregnancies and healthy newborns. Today, one in five women in the United States has her first child after age 35 (March of Dimes, 2011f).

Nursing Assessment

Nursing assessment of the pregnant woman over age 35 is the same as that for any pregnant woman. For a woman of this age, a preconception visit is important to identify chronic health problems that might affect the pregnancy and also to address lifestyle issues that may take time to modify. Encourage the older woman to plan for the pregnancy by seeing her health care provider before getting pregnant to discuss preexisting medical conditions, medications, and lifestyle choices. Assess the woman for risk factors such as cigarette smoking, poor nutrition, overweight or underweight, alcohol use, or illicit drug use.

A preconception visit also provides the opportunity to educate the woman about risk factors and provide information on how to modify her lifestyle habits to improve the pregnancy outcome. Assist the woman with lifestyle changes so that she can begin pregnancy in an optimal state of health. For example, if the woman is overweight, educate her about weight loss so that she can start the pregnancy at a healthy weight. If the woman smokes, encourage smoking cessation to reduce the effects of nicotine on herself and her fetus.

Prepare the woman for laboratory and diagnostic testing to establish a baseline for future comparisons. The risk of having a baby with Down syndrome increases with age, especially over age 35. Amniocentesis is routinely offered to all older women to allow the early detection of numerous chromosomal abnormalities, including Down syndrome. Additionally, a quadruple blood test screen (alpha fetoprotein [AFP], human chorionic gonadotropin [hCG], unconjugated estriol [UE], and inhibin A [placental hormone]) drawn between 15 and 20 weeks of pregnancy can be helpful in screening for Down syndrome and neural tube defects.

Nursing Management

During routine prenatal visits, the nurse can play a key role in promoting a healthy pregnancy. Consider social, genetic, and environmental factors that are unique to the older pregnant women and prepare to address these factors when providing care. In a study by Kort and colleagues (2011), compared with the younger women, older women had statistically similar rates of gestational hypertension, gestational diabetes, preterm premature rupture of membranes/preterm labor, and abnormal placentation. Cesarean birth was higher in older women versus younger ones. Neonatal outcomes of gestational age and birth weight were excellent and similar between groups.

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Assess the woman's knowledge about risk factors and measures to reduce them. Educate her about measures to promote a positive outcome. Encourage her to get early and regular prenatal care. Advise her to eat a variety of nutritious foods, especially fortified cereals, enriched grain products, and fresh fruits and vegetables, and drink at least six to eight glasses of water daily and to take the prescribed vitamin containing 400 mcg of folic acid daily. Also stress the need for her to avoid alcohol intake during pregnancy, avoid exposure to secondhand smoke, and take no drugs unless they are prescribed. Provide continued surveillance of the mother and fetus throughout the pregnancy.

The Obese Pregnant Woman

Obese pregnant women are a particularly vulnerable group because their disability (obesity) is highly visible. In the United States, nearly 36% of adults are obese, including one out of three women (WHO, 2011). Excess weight and obesity have gained attention as serious health care threats globally. Obesity contributes to social, psychological, and economic problems throughout a woman's lifetime. Negative attitudes and discrimination by society can have negative consequences for the woman's quality of life. The number of women who are overweight or obese during pregnancy has also increased. During pregnancy, excess weight increases both obstetric and neonatal risks, including:

- Gestational diabetes
- Hypertension
- Thromboembolism
- Fetal macrosomia (birth weight. >4000 grams)
- Difficulty fighting postpartum infections
- Tendency to remain overweight/obesity between pregnancies
- Prolongation of pregnancy/increased likelihood of post-term infant
- Increased risk of stillbirth
- Higher rate of cesarean births
- Increased risk of maternal mortality
- High risk for postpartum hemorrhage (Hull, Montgomery, Vireday, & Kendall-Tackett, 2011).

Negative or judgmental attitudes toward overweight or obese individuals can be encountered within the health care community and its providers, including nurses (Nyman, Prebensen, & Flensner, 2010).

Individualized nursing care for obese pregnant women is obvious. Extra time may be needed to promote healthful practices, which should include dealing with issues of weight, diet, and exercise. This care must be done with honesty and respect for all of the woman's needs. There is an opportunity for health promotion aimed at disseminating information about the risks of obesity in pregnancy to overweight and obese women of childbearing age.

The Pregnant Woman with Substance Abuse

The epidemic of substance abuse continues to pose a significant challenge to all nations. Although there is a tendency to simply associate drug abuse with poverty, the problem affects every social stratum, gender, and race; and pregnant women are no exception. **Perinatal drug abuse** is the use of alcohol and

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other drugs by pregnant women. The incidence of substance abuse during pregnancy is highly variable because most pregnant women are reluctant to reveal the extent of their use. The National Institute on Drug Abuse (NIDA) (2011b) estimates that 7% of the women in the United States have used illicit drugs while pregnant. These include cocaine, marijuana, heroin, and psychotherapeutic drugs that were not prescribed by a health care professional. More than 20% used alcohol and 19% smoked cigarettes during their pregnancy (2011b).

Impact of Substance Abuse on Pregnancy

Substance use can be viewed along a continuum between social recreational drug use and addiction. Substance abuse is very prevalent remains and continues to remain undetected and underdiagnosed in many pregnant women.

The positive overall impact of adequate prenatal care on birth outcomes is well documented. For pregnant substance users, the receipt of adequate prenatal care is especially critical. Several studies have reported that increasing the adequacy of prenatal care utilization in pregnant substance users reduces risks for prematurity, low birth weight, and perinatal mortality. However, many pregnant women who are substance users do not seek prenatal care for fear of being reported to Child Protective Services (Roberts & Pies, 2011).

The use of drugs, legal or not, increases the risk of medical complications in the mother and poor birth outcomes in the newborn. The placenta acts as an active transport mechanism, not as a barrier, and substances pass from a mother to her fetus through the placenta. Thus, along with the mother, the fetus experiences substance use, abuse, and addiction. Additionally, fetal vulnerability to drugs is much greater because the fetus has not developed the enzymatic system needed to metabolize drugs (Gilbert, 2011).

Effects of Addiction

Addiction is a multifaceted process that is affected by environmental, psychological, family, and physical factors. Women who use drugs, alcohol, or tobacco come from all socioeconomic backgrounds, cultures, and lifestyles. Factors associated with substance abuse during a pregnancy may include low self-esteem, inadequate support systems, low self-expectations, high levels of anxiety, socioeconomic barriers, involvement in abusive relationships, chaotic familial and social systems, and a history of psychiatric illness or depression. Women often become substance abusers to relieve their anxieties, depression, and feelings of worthlessness (Bennett et al., 2010).

Societal attitudes regarding women and substance abuse may prohibit them from admitting the problem and seeking treatment. Society sanctions women for failing to live up to expectations of how a pregnant woman "should" behave, thereby possibly driving them further away from the treatment they so desperately need. For many reasons, pregnant women who abuse substances feel unwelcome in prenatal clinics or medical settings. Often they seek prenatal care late or not at all. They may fear being shamed or reported to legal or child protection authorities. A nonjudgmental atmosphere and unbiased

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teaching to all pregnant women regardless of their lifestyle is crucial. A caring, concerned manner is critical

to help these women feel safe and respond honestly to assessment questions.

Pregnancy can be a motivator for some who want to try treatment. The goal of therapy is to help the client deal with pregnancy by developing a trusting relationship. Providing a full spectrum of medical, social, and emotional care is needed.

Effects of Commonly Abused Substances

Substance abuse in pregnancy has increased during the past three decades in the United States, resulting in approximately 250,000 infants being born yearly with prenatal exposure to illicit substances (CDC, 2011e). Routine screening and education of women of childbearing age remain the most important ways to reduce addiction in pregnancy.

Substance abuse during pregnancy, particularly in the first trimester, has a negative effect on the health of the mother and the growth and development of the fetus. The fetus experiences the same systemic effects as the mother, but often more severely. The fetus cannot metabolize drugs as efficiently as the expectant mother and will experience the effects long after the drugs have left the women's system. Substance abuse during pregnancy is associated with preterm labor, abortion, IUGR, abruptio placenta, low birth weight, neurobehavioral abnormalities, and long-term childhood developmental consequences (Pinto et al., 2010). **Table 20.6** summarizes the effects of selected drugs during pregnancy. *Healthy People 2020* also addresses goals for perinatal substance abuse.

TABLE 20.6: EFFECTS OF SELECTED DRUGS ON PREGNANCY

Substance	Effect on Pregnancy
Alcohol	Spontaneous abortion, inadequate weight gain, IUGR, fetal alcohol spectrum disorder, the leading cause of intellectual disability
Caffeine	Vasoconstriction and mild diuresis in mother; fetal stimulation, but teratogenic effects not documented via research
Nicotine	Vasoconstriction, reduced uteroplacental blood flow, decreased birth weight, abortion, prematurity, abruptio placentae, fetal demise
Cocaine	Vasoconstriction, gestational hypertension, abruptio placentae, abortion, "snow baby syndrome," CNS defects, IUGR

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Substance	Effect on Pregnancy
Marijuana	Anemia, inadequate weight gain, "amotivational syndrome," hyperactive startle reflex, newborn tremors, prematurity, IUGR
Opiates and Narcotics	Maternal and fetal withdrawal, abruptio placentae, preterm labor, premature rupture of membranes, perinatal asphyxia, newborn sepsis and death, intellectual impairment, malnutrition
Sedatives	CNS depression, newborn withdrawal, maternal seizures in labor, newborn abstinence syndrome, delayed lung maturity

Adapted from Centers for Disease Control and Prevention. (2011e). *Illegal drug use in the United States*. Retrieved from <http://www.cdc.gov/nchs/fastats/druguse.htm>; Gilbert, E. S. (2011). *Manual of high risk pregnancy and delivery* (5th ed.). St. Louis, MO: Mosby Elsevier; and March of Dimes (2011e). *Illicit drug use during pregnancy*. Retrieved from http://www.marchofdimes.com/professionals/14332_1169.asp.

ALCOHOL

Alcohol abuse is a major public health issue in the United States. Alcohol is a teratogen, a substance known to be toxic to human development. Approximately 10% of pregnant women report alcohol consumption (CDC, 2011e). Theoretically, no mother would give a glass of wine, beer, or hard liquor to her newborn, but when she drinks, her embryo or fetus is exposed to the same blood alcohol concentration as she is.

The teratogenic effects of heavy maternal drinking have been recognized since 1973, when fetal alcohol syndrome was first described. Fetal alcohol syndrome is now a classification under the broader term of **fetal alcohol spectrum disorder (FASD)**; this disorder includes the full range of birth defects, such as structural anomalies and behavioral and neurocognitive disabilities caused by prenatal exposure to alcohol (Mizejewski, 2010). FASD affects 1 in 100 infants each year, more than autism, and Down syndrome, cerebral palsy, cystic fibrosis, spina bifida, and sudden infant death syndrome (SIDS) combined (National Organization on Fetal Alcohol Syndrome [NOFAS], 2011). Each year in the United States, up to 50,000 infants are born with FASD. It is the leading cause of nongenetic intellectual disability in the United States, possibly exceeding even Down syndrome, which is currently approaching 1 in 500 live births. Alcohol consumption during pregnancy results in brain, craniofacial, and heart defects, neurotoxicity, and immune systems dysfunction. The preferred action taken to prevent alcohol consumption during pregnancy is abstinence. However, the detection, diagnosis, and treatment of FASD remain major public health needs in this country and throughout the world.

Not every woman who drinks during pregnancy will give birth to an affected child. Based on the best research available, the following is known about alcohol consumption during pregnancy:

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- Intake increases the risk of alcohol-related birth defects, including growth deficiencies, facial abnormalities, CNS impairment, behavioral disorders, and intellectual development.
- No amount of alcohol consumption is considered safe during pregnancy.
- Damage to the fetus can occur at any stage of pregnancy, even before a woman knows she is pregnant.
- Cognitive defects and behavioral problems resulting from prenatal exposure are lifelong.
- Alcohol-related birth defects are completely preventable (U.S. Department of Health and Human Services, 2011).

Risk factors for giving birth to an alcohol-affected newborn include maternal age, socioeconomic status, ethnicity, genetic factors, poor nutrition, depression, family disorganization, unplanned pregnancy, and late prenatal care (CDC, 2011b). Identification of risk factors strongly associated with alcohol-related birth outcomes could help identify high-risk pregnancies requiring intervention.

Characteristics of FASD include craniofacial dysmorphism (thin upper lip, small head circumference, and small eyes), IUGR, microcephaly, and congenital anomalies such as limb abnormalities and cardiac defects. Long-term sequelae include postnatal growth restriction, attention deficits, delayed reaction time, and poor scholastic performance (NOFAS, 2011). The complex neurobehavioral problems typically manifest themselves insidiously. Children with prenatal alcohol exposure struggle with cognitive, academic, social, emotional, and behavioral challenges. These challenges reduce the child's ability to learn and function successfully in many structured environments (Blakemore 2012). Common cognitive and behavioral problems are listed in [Box 20.4](#), and [Figure 20.8](#) illustrates the characteristic facial features. See [Chapter 24](#) for a more detailed discussion of the newborn with FASD.

BOX 20.4: COMMON COGNITIVE AND BEHAVIORAL PROBLEMS ASSOCIATED WITH FASD

- Attention deficit/hyperactivity disorder (ADHD)
- Inability to foresee consequences
- Inability to learn from previous experience
- Lack of organization
- Learning difficulties
- Poor abstract thinking
- Poor reasoning and judgment skills
- Poor memory
- Poor impulse control
- Speech and language problems
- Poor judgment

Adapted from Centers for Disease Control and Prevention. (2011b). *Fetal alcohol spectrum disorders*. Retrieved from <http://www.cdc.gov/ncbddd/fasd/alcohol-use.html>.

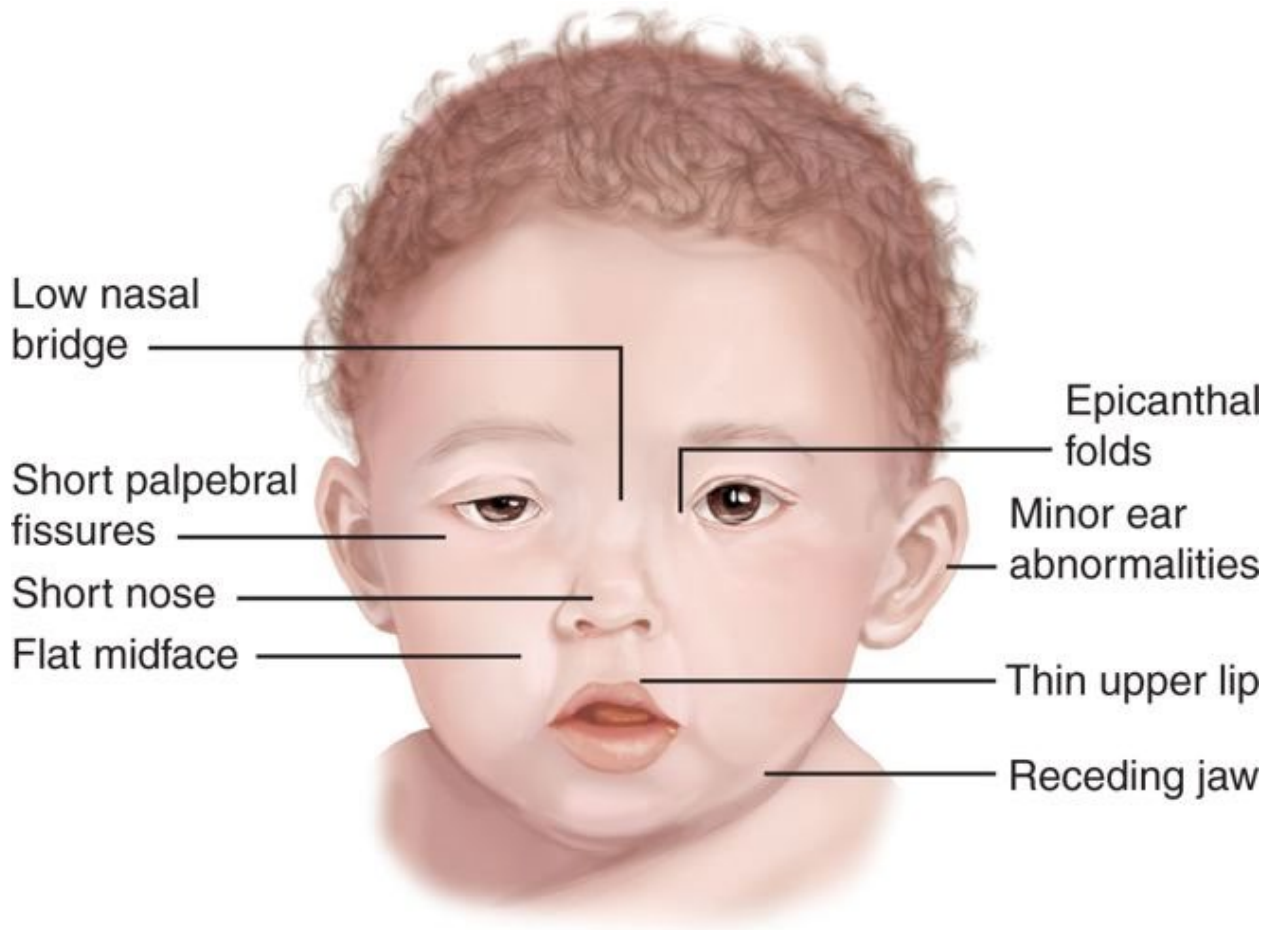


FIGURE 20.8

Typical facial characteristics of a newborn with FASD.

One of the biggest challenges in determining the true prevalence of FASD is how to recognize the syndrome, which depends in part on the age and physical features of the person being assessed. Difficulty identifying alcohol abuse results from the client's denial of alcohol use, unwillingness to report alcohol consumption, underreporting, and limited ability to recollect the frequency, quantity, and type of alcohol consumed. This makes it difficult to identify women who are drinking during pregnancy, institute preventive measures, or refer them for treatment.

Women who drink excessively while pregnant are at high risk for giving birth to children with birth defects. To prevent these defects, women should stop drinking during all phases of a pregnancy. Unfortunately, many women continue to drink during their pregnancy despite warnings from professionals.

Currently, it is not known whether there is a minimal amount of alcohol safe to drink during pregnancy; an occasional glass of wine might be harmless or might not be. Therefore, eliminating alcohol consumption during pregnancy is the ultimate goal to prevent FASD. Most women know they shouldn't drink during pregnancy, but the "window of vulnerability"—the time lag between conception and the discovery of pregnancy—may put substantial numbers of

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children at risk. Additionally, traditional alcohol-screening questionnaires, such as the Michigan Alcoholism Screening Test (MAST) and the CAGE Questionnaire, are not sensitive enough to detect low levels of alcohol consumption among women.

Several challenges remain in preventing birth defects due to alcohol consumption:

- Ways to improve clinical recognition of high-risk women who drink alcohol
- Ways to intervene more effectively to modify drinking behaviors
- In utero approaches to prevent or minimize fetal injury
- Strategies to address the neurodevelopmental problems of children affected by maternal alcohol ingestion

NONMEDICAL USE OF PRESCRIPTION DRUGS

In addition to alcohol and illicit drug use, a new worldwide trend has emerged and may soon exceed illicit drug use. That is, the nonmedical use of prescription drugs found in many home medicine cabinets. Common drugs of choice include analgesics, stimulants, sedatives, and tranquilizers. A frequent belief among abusers is that prescribed medications are less dangerous than street drugs and using a friend's medication is safe. Unfortunately, unintentional poisoning deaths occur frequently. In addition, the development of a counterfeit market has developed utilizing the Internet, thereby creating a global counterfeit drug market (Wong, Ordean, & Kahan, 2011).

Early detection through a comprehensive evaluation is essential to improve overall treatment outcomes. A major role of the nurse is to focus on prevention in the first place through education of all women about the dangers associated with misuse of prescription medications. Community education is vital to manage risks to prevent problems from developing.

CAFFEINE

Caffeine is a widely used and accepted pharmacologically active substance. The effect of caffeine intake during pregnancy on fetal growth and development is still unclear. A recent study found that caffeine intake of no more than 300 mg/day during pregnancy does not affect pregnancy duration and the condition of the newborn (Jarosz, Wierzejska, & Siuba, 2012). Caffeine, a CNS stimulant, is present in varying amounts in such common products as coffee, tea, colas, and chocolate. It is also in cold remedies and analgesics. Birth defects have not been linked to caffeine consumption, but maternal coffee consumption decreases iron absorption and may increase the risk of anemia during pregnancy.

Moderate caffeine consumption (less than 300 mg/day) does not appear to be a major contributing factor in miscarriage or preterm birth. The relationship of caffeine to growth restriction remains undetermined. A final conclusion cannot be made at this time as to whether there is a correlation between high caffeine intake and miscarriage due to lack of sufficient studies (ACOG, 2010a).

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NICOTINE

Cigarette smoking during pregnancy is associated with numerous obstetric, fetal, and developmental complications, as well as an increased risk of adverse health consequences in the adult offspring. Nicotine replacement therapy (NRT) has been developed as a pharmacotherapy for smoking cessation and is considered to be a safer alternative for women to smoking during pregnancy. The safety of NRT (transdermal patches and bupropion) use during pregnancy has been evaluated in a limited number of short-term human trials, but there is currently no information on the long-term effects of developmental nicotine exposure in humans (Clark & Nakad, 2011).

Nicotine is found in cigarettes, and is another substance that is harmful to the pregnant women and her fetus. Nicotine, which causes vasoconstriction, transfers across the placenta and reduces blood flow to the fetus, contributing to fetal hypoxia. When compared with alcohol, marijuana, and other illicit drug use, tobacco use is less likely to decline as the pregnancy progresses (McGowen et al., 2010). Smoking is associated with adverse pregnancy outcomes. However, these adverse outcomes can be avoided if the woman stops smoking before becoming pregnant.

Smoking increases the risk of spontaneous abortion, preterm labor and birth, maternal hypertension, placenta previa, and abruptio placentae. The perinatal death rate among infants of smoking mothers is 20% to 35% higher than that of nonsmoking mothers (Galloway, 2012).

Smoking has also been considered an important risk factor for low birth weight, SIDS, and cognitive deficits, especially in language, reading, and vocabulary, as well as poorer performances on tests of reasoning and memory. Researchers have also reported behavior problems, such as increased activity, inattention, impulsivity, opposition, and aggression (Blood-Siegfried & Rende, 2010).

Women who smoke during the pregnancy often continue to smoke after giving birth, and thus the infant will be exposed to nicotine after birth. This environmental or passive exposure affects the child's development and increases the risk of childhood respiratory disorders.

COCAINE

Cocaine use is second only to marijuana use in women who abuse drugs during pregnancy. The incidence of cocaine exposure in utero is 1 to 10 per 1,000 live births (Strathearn & Mayes, 2010). There is evidence that cocaine affects infant development both directly, via in utero exposure, and indirectly via alterations in maternal care after birth.

Cocaine is a psychoactive drug derived from the leaves of the coca plant, which grows in the Andes Mountains of Peru, Ecuador, and Bolivia. The freebase form, called "crack" because of the cracking or popping noise made in its preparation, is less expensive, easily made, and smokable. Cocaine is a powerful vasoconstrictor. When sniffed into the mucous membranes of the nose, it produces an intense "rush" that some have compared to an orgasmic experience. Smoked crack is absorbed rapidly by the pulmonary vasculature and reaches the brain's circulation in 6 to 8 seconds (NIDA, 2011a).

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Cocaine use produces vasoconstriction, tachycardia, and hypertension in both the mother and the fetus (Keegan, Parva, Finnegan, Gerson, & Belden, 2010). Uteroplacental insufficiency may result from reduced blood flow and placental perfusion. Chronic use can result in low birth weight, the most common effect of cocaine use in pregnancy (NIDA, 2011a).

Studies suggest that perinatal cocaine use increases the risk of preterm labor, abortion, abruptio placentae, IUGR, intrauterine fetal distress and demise, seizures, withdrawal, and cerebral infarcts. Cocaine may increase the risk of uterine rupture and congenital anomalies (NIDA, 2011a). Fetal anomalies associated with cocaine use in early pregnancy involve neurologic problems such as neural tube defects and microcephaly; cardiovascular anomalies such as congenital heart defects; genitourinary conditions such as prune belly syndrome, hydronephrosis, and ambiguous genitalia; and gastrointestinal system problems such as necrotizing enterocolitis (Prentice, 2010). Some infants exposed to cocaine in utero show increased irritability and are difficult to calm and soothe to sleep.

MARIJUANA

Marijuana is the most commonly used illicit drug in America, with over 90 million people having tried it at least once. It is often called pot, reefer, herb, widow, hash, grass, weed, Mary Jane, or MJ (NIDA, 2011c). Marijuana is a preparation of the leaves and flowering tops of *Cannabis sativa*, the hemp plant, which contains a number of pharmacologically active agents. Tetrahydrocannabinol (THC) is the most active ingredient of marijuana. With heavy smoking, THC narrows the bronchi and bronchioles and produces inflammation of the mucous membranes. Smoking marijuana causes tachycardia and a reduction in blood pressure, resulting in orthostatic hypotension.

The effects of marijuana smoking on pregnancy are not yet fully understood because there are very few studies on its long-term effects on child development. One can speculate that the effects of marijuana on the immature nervous system may be subtle and not detected until more complex functions are required, usually in a formal educational setting. There is some evidence that marijuana increases the risk of spontaneous abortion and preterm delivery (van Gelder et al., 2010). Although marijuana is not considered teratogenic, many newborns display altered responses to visual stimuli, increased tremulousness, and a high-pitched cry, which might indicate CNS insults (Prentice, 2010). A strong correlation exists between the use of marijuana and the use of alcohol and cigarettes.

OPIATES AND NARCOTICS

Opiates and narcotics include opium, heroin (known as horse, junk, smack, downtown), morphine, codeine, hydromorphone (Dilaudid; little D), oxycodone (Percodan, perxies), meperidine (Demerol, demise), and methadone (meth, dollies). These drugs are CNS depressants that soothe and lull. They may be used medically for pain, but all have a high potential for abuse. Most cause an intense addiction in both mother and newborn.

Narcotic dependence is particularly problematic in pregnant women. It leads to medical, nutritional, and social neglect by the woman due to the long-term risks of physical dependence, malnutrition,

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compromised immunity, hepatitis, and fatal overdose (Alexander, LaRosa, Bader, & Garfield, 2010). Taking opiates or narcotics during pregnancy places the woman at increased risk for preterm labor, IUGR, and preeclampsia (Wang, 2012).

Heroin is the most common illicitly used opioid. It is derived from the seeds of the poppy plant and can be sniffed, smoked, or injected. It crosses the placenta via simple diffusion within 1 hour of maternal consumption (Bandstra, Morrow, Mansoor, & Accornero, 2010). Use of heroin during pregnancy is believed to affect the developing brain of the fetus and may cause behavioral abnormalities in childhood (Alexander et al., 2010).

The most common harmful effect of heroin and other narcotics on newborns is withdrawal, or **neonatal abstinence syndrome** (see [Chapter 24](#)). This collection of symptoms may include irritability, hypertonicity, excessive and often high-pitched cry, vomiting, diarrhea, feeding disturbances, respiratory distress, disturbed sleeping, excessive sneezing and yawning, nasal stuffiness, diaphoresis, fever, poor sucking, tremors, and seizures (Wang, 2012).

Withdrawal from opiates during pregnancy is extremely dangerous for the fetus, so a prescribed oral methadone maintenance program combined with psychotherapy is recommended for the pregnant woman. This closely supervised treatment program reduces withdrawal symptoms in the newborn, reduces drug cravings, and blocks the euphoric effects of narcotic drugs in order to reduce illicit drug use. Methadone maintenance provides a steady state of opiate levels, thus reducing the risk of withdrawal to the fetus and exposure to HIV and other STIs because the mother is no longer injecting drugs. However, methadone has the same withdrawal consequences for women and newborns as heroin does (Kreek, Borg, Ducat, & Ray, 2010).

SEDATIVES

Sedatives relax the central nervous system and are used medically for inducing relaxation and sleep, relieving tension, and treating seizures. Sedatives easily cross the placenta and can cause birth defects and behavioral problems. Infants born to mothers who abuse sedatives during pregnancy may be physically dependent on the drugs themselves and are more prone to respiratory problems, feeding difficulties, disturbed sleep, sweating, irritability, and fever (Alexander et al., 2010).

METHAMPHETAMINES

Methamphetamine use is now more common than cocaine use in pregnancy, and its use by women of childbearing age is increasing in the United States. This highly addictive stimulant is commonly known as speed, meth, or chalk. In its smoked form, it is often referred to as ice, crystal, crank, and glass. It is a white, odorless, bitter-tasting powder that was developed from its parent drug, amphetamine, and was used originally in nasal decongestants and bronchial inhalers. The maternal effects include increased energy and alertness, an intense rush, decreased appetite, tachycardia, and tachypnea. Chronic use can lead to psychosis, including paranoia, hallucinations, memory loss, and aggressive or violent behavior. Signs of methamphetamine use include track marks from intravenous injection, malnutrition, severe

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dental decay (meth mouth), and skin abscesses from skin picking (LaGasse et al., 2011). Few studies have been done on the effects of methamphetamine abuse during pregnancy, but the few done indicate an increased risk for preterm births, placental abruption, fetal growth restriction, and congenital anomalies (NIDA, 2011d). These findings are hard to interpret, however, due to small sample size and polydrug use of the participants.

Nursing Assessment

Complete a thorough history and physical examination to evaluate a client for substance use and abuse. Substance abuse screening in pregnancy is done to detect the use of any substance known or suspected to exert a deleterious effect on the client or her fetus. Routinely ask about substance abuse with all women of childbearing age, inform them of the risks involved, and advise them against continuing. Screening questionnaires are helpful in identifying potential users, may reduce the stigma of asking clients about substance abuse, and may result in a more accurate and consistent evaluation. The questions in **Box 20.5** may be helpful in assessing a client who is at risk for substance abuse during pregnancy. Using “accepting” terminology may encourage the woman to give honest answers without fear of reproach.

BOX 20.5: SAMPLE QUESTIONS FOR ASSESSING SUBSTANCE USE

- Have you ever used recreational drugs? If so, when and what?
- Have you ever taken a prescription drug other than as intended?
- What are your feelings about drug use during pregnancy?
- How often do you smoke cigarettes? How many per day?
- How often do you drink alcohol?
- Have you ever felt guilty about drinking or drug use?

If the assessment reveals substance use, obtain additional information by using the RAFFT questionnaire, which is a sensitive screening instrument for identifying substance abuse (Muhrrer, 2010):

- **R:** Do you drink or take drugs to **R**elax, improve your self-image, or fit in?
- **A:** Do you ever drink or take drugs while **A**lone?
- **F:** Do you have any close **F**riends who drink or take drugs?
- **F:** Does a close **F**amily member have a problem with alcohol or drugs?
- **T:** Have you ever gotten in **T**rouble from drinking or taking drugs?

A woman who claims to have taken no drugs while pregnant may be unaware that substances such as hair dye, diet cola, paint, or over-the-counter medications for colds or headaches are still considered drugs. Thus, it is very difficult to get a true picture of the real use of drugs by pregnant women.

Many drugs are considered to have a teratogenic effect on growing fetuses. A **teratogen** is any environmental substance that can cause physical defects in the developing embryo and fetus. Pregnant women with substance abuse commonly present with polysubstance abuse, which is likely to be more

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damaging than the use of any single substance. Thus, it is inherently difficult to ascribe a specific perinatal effect to any one substance (Gilbert, 2011).

A urine toxicology screen may also be helpful in determining drug use, although a urine screen identifies only recent or heavy use of drugs. The length of time a drug is present in urine is as follows:

- Cocaine: 24 to 48 hours in an adult, 72 to 96 hours in an infant
- Heroin: 24 hours in an adult, 24 to 48 hours in an infant
- Marijuana: 1 week to 1 month in an adult, up to a month or longer in an infant
- Methadone: up to 10 days in an infant (Wang, 2012)

Nursing Management

If the woman's drug screen is positive, use this as an opportunity to discuss prenatal exposure to substances that may be harmful. The discussion may lead the nurse to refer the client for a diagnostic assessment or identify an intervention such as counseling that may be helpful. Being nonjudgmental is a key to success; a client is more apt to trust and reveal patterns of abuse if the nurse does not judge her and her lifestyle choices.

A positive drug screen in a newborn warrants an investigation by the state protection agency. In the interim, institute measures to reduce stress and stimuli to promote the newborn's comfort (see [Chapter 24](#) for a more in-depth discussion).

Be proactive, supportive, and accepting when caring for the client. Assure women with substance abuse problems that sharing information of a confidential nature with health care providers will not render them liable to criminal prosecution. Provide counseling and education, emphasizing the following:

- Effects of substance exposure on the fetus
- Interventions to improve mother-child attachment and improve parenting
- Psychosocial support if treatment is needed to reduce substance abuse
- Referral to outreach programs to improve access to treatment facilities
- Hazardous legal substances to avoid during pregnancy
- Follow-up of children born to substance-dependent mothers
- Dietary counseling to improve the pregnancy outcome for both mother and child
- Drug screening to identify all drugs a client is using
- More frequent prenatal visits to monitor fetal well-being
- Maternal and fetal benefits of remaining drug free
- Cultural sensitivity
- Coping skills, support systems, and vocational assistance

There is nothing categorically different about addiction in pregnancy compared with addiction in general. Pregnant women who use drugs are women who use drugs, get pregnant, and cannot stop using drugs. The fact that they are condemned in society leads to their further marginalization, which does nothing to improve their lives or the lives of their children.

Substance abuse is a complex problem that requires sensitivity to each woman's unique situation and contributing factors. Be sure to address individual psychological and sociocultural factors to help the

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woman regain control of her life. Treatment must combine different approaches and provide ongoing support for women learning to live drug free. Developing personal strengths, such as communication skills, assertiveness, and self-confidence, will help the woman to resist drug use. Encourage the use of appropriate coping skills. Enhancing self-esteem also helps provide a foundation to avoid drugs.

KEY CONCEPTS

- Preconception counseling for the woman with diabetes is helpful in promoting blood glucose control to prevent congenital anomalies.
- The classification system for diabetes is based on disease etiology and not pharmacology management; the classification includes type 1 diabetes, type 2 diabetes, gestational diabetes, and impaired fasting glucose and impaired glucose tolerance.
- A functional classification for heart disease during pregnancy is based on past and present disability: class I, asymptomatic with no limitation of physical activity; class II, symptomatic (dyspnea, chest pain) with increased activity; class III, symptomatic (fatigue, palpitation) with normal activity; and class IV, symptomatic at rest or with any physical activity.
- Chronic hypertension exists when the woman has a blood pressure of 140/90 mm Hg or higher before pregnancy or before the 20th week of gestation or when hypertension persists for more than 12 weeks' postpartum.
- Successful management of asthma in pregnancy involves elimination of environmental triggers, drug therapy, and client education.
- Ideally, women with hematologic conditions are screened before conception and are made aware of the risks to themselves and to a pregnancy.
- A wide variety of infections, such as cytomegalovirus, rubella, herpes simplex, hepatitis B, varicella, parvovirus B19, and many sexually transmitted infections can affect a pregnancy, having a negative impact on its outcome.
- The prevalence of HIV/AIDS is increasing more rapidly among women than men: half of all the HIV/AIDS cases worldwide now occur in women. There are only three recognized modes of HIV transmission: unprotected sexual intercourse with an infected partner, contact with infected blood or blood products, and perinatal transmission. Breast-feeding is a major contributing factor in mother-to-child transmission of HIV.
- Cases of perinatal AIDS have decreased in the past several years in the United States, primarily because of the use of zidovudine (ZDV) therapy in pregnant women with HIV. The U.S. Preventive Services Task Force recommends that all pregnant women should be offered HIV antibody testing regardless of their risk of infection, and that testing should be done during the initial prenatal evaluation.
- The younger an adolescent is at the time of her first pregnancy, the more likely it is that she will have another pregnancy during her teens. About 1 million teenagers between the ages of 15 and 19 become pregnant each year; about half give birth and keep their infants.

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- The nurse's role in caring for the pregnant adolescent is to assist her in identifying the options for this pregnancy, including abortion, self-parenting of the child, temporary foster care for the baby or herself, or placement for adoption.
- Pregnant women with substance abuse problems commonly abuse several substances, making it difficult to ascribe a specific perinatal effect to any one substance. Societal attitudes regarding pregnant women and substance abuse may prohibit them from admitting the problem and seeking treatment.
- Substance abuse during pregnancy is associated with preterm labor, abortion, low birth weight, CNS and fetal anomalies, and long-term childhood developmental consequences.
- Fetal alcohol spectrum disorder is a lifelong yet completely preventable set of physical, mental, and neurobehavioral birth defects; it is the leading cause of intellectual disability in the United States.
- Nursing management for the woman with substance abuse focuses on screening and preventing substance abuse to reduce the high incidence of obstetric and medical complications as well as the morbidity and mortality among passively addicted newborns.