

CHAPTER Nursing Care 22 of Clients with Nutritional Disorders

LEARNING OUTCOMES

- Compare and contrast the pathophysiology and manifestations of nutritional disorders.
- Identify causes and predict effects of nutritional disorders on client health status.
- Explain interdisciplinary care for clients with nutritional disorders.
- Develop strategies to promote nutrition for client populations.

CLINICAL COMPETENCIES

- Assess the functional health status of clients with nutritional disorders.
- Monitor nutritional status and responses to care; document and report abnormal or unexpected responses.
- Use assessed data to determine priority nursing diagnoses and select and implement nursing interventions.
- Administer medications and enteral and parenteral nutrition knowledgeably and safely.
- Integrate interdisciplinary care in the plan of care.
- Adapt cultural values and variations into the plan of care for clients with nutritional disorders.
- Plan and provide client and family teaching to restore, promote, and maintain functional health status.
- Evaluate responses to care and use data to revise plan of care as needed.

MEDIALINK



Resources for this chapter can be found on the Prentice Hall Nursing MediaLink DVD-ROM accompanying this textbook, and on the Companion Website at <http://www.prenhall.com/lemone>



KEY TERMS

anorexia nervosa, 650

basal metabolic rate (BMR), 631

binge-eating disorder, 650

body mass index (BMI), 630

bulimia nervosa, 650

catabolism, 641

enteral nutrition, 644

lower body obesity, 632

malnutrition, 641

morbid obesity, 632

nutrients, 631

obesity, 630

protein-calorie malnutrition (PCM), 641

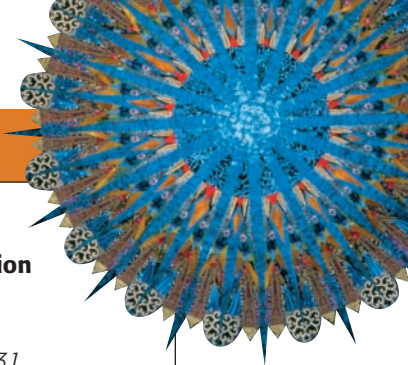
starvation, 641

total parenteral nutrition (TPN), 646


triglycerides, 631

upper body obesity, 631

very low calorie diet (VLCD), 635



Obesity and malnutrition, the major nutritional disorders in the world today, affect many systems and organs. They often cause serious health problems, such as hypertension, heart disease, fluid and electrolyte imbalances, disability, and even death.

Clients with nutritional disorders require complex, skilled nursing care. Developmental, sociocultural, psychologic, and physiologic factors may play a role in these disorders: A holistic approach to nursing care is vital. Nursing care focuses on identifying causes, meeting nutritional and physiologic needs, providing client education, and meeting the psychologic needs of clients and families. Before proceeding with the discussion of obesity and malnutrition, review the sections on metabolism and nutrients in Chapter 21 .

THE CLIENT WITH OBESITY

Obesity, an excess of adipose tissue, is one of the most prevalent, preventable health problems in the United States. Obesity has serious physiologic and psychologic consequences, and is associated with increased morbidity and mortality. It contributes to poor health-related quality of life to a greater extent than smoking, excess alcohol use, or poverty. It will soon replace smoking as the leading preventable cause of death in the United States if current trends continue (Uphold & Graham, 2003). Health-related problems associated with obesity are listed in Table 22–1.

While obesity is often defined by weight, it is more accurately defined by the **body mass index (BMI)**, an indirect measure of the amount of body fat, or adipose tissue. Adipose tissue is created when energy consumption exceeds energy expenditure. A BMI of 25 to 29.9 kg/m² is classified as *overweight*; obesity is a BMI of 30 kg/m² or greater (National Institutes of Health [NIH], 2004). The terms *overweight* and *obese* are not mutually exclusive; a client who is obese also is overweight.

Incidence and Prevalence

More than 30% of the adult population in the United States is obese; nearly two-thirds of all adults in the United States are overweight. The incidence of obesity is higher in women, in blacks, and in economically disadvantaged people of all races (Kasper et al., 2005; Tierney et al., 2005). While the prevalence of overweight has been increasing since 1960, the prevalence of obesity is increasing to a greater extent, particularly during the past 10 to 15 years (National Heart, Lung, and Blood Institute [NHLBI], 2000). Of particular concern is the increasing incidence of obesity in children and young adults. The incidence

TABLE 22–1 Health-Related Problems Associated with Obesity

BODY SYSTEM	OBESITY-RELATED PROBLEMS
Cardiovascular	Atherosclerosis, hypercholesterolemia Coronary heart disease Heart failure Hypertension Stroke Varicosities Venous thrombosis
Respiratory	Sleep disorders Sleep apnea
Gastrointestinal	Gallbladder disease Hiatal hernia Colon cancer
Genitourinary	Cancers of the breast, uterus, prostate, and colon Complications of pregnancy Stress incontinence
Musculoskeletal	Low back pain Muscle strains and sprains Osteoarthritis
Endocrine and Reproductive	Diabetes mellitus, type 2 Endometrial cancer Polycystic ovarian syndrome
Other	Depression Binge-eating disorder Postoperative complications

of overweight and obesity varies among ethnic and cultural groups. Adults of Asian heritage generally have a lower incidence of overweight and obesity. See the Focus on Cultural Diversity box that follows.

FAST FACTS

Prevalence of overweight and obesity in the United States:

- Women
 - Black: 77.3%
 - Hispanic: 71.9%
 - White: 57.3%
- Men
 - Black: 60.7%
 - Hispanic: 74.7%
 - White: 67.4%



FOCUS ON CULTURAL DIVERSITY

Obesity

While the prevalence of overweight and obesity has increased among nearly all populations in the United States, black women have the highest prevalence of overweight and obesity. Cultural factors play a role; historically, large black women were viewed as wealthy, valued, and able to carry a pregnancy to term (Johnson & Broadnax, 2003). Differences in perception of body image and weight-related concerns also play a role. In general, black girls and women report less social pressure to be slim, less dissatisfaction with weight and body image, and fewer incidents of discrimination related to weight (NHLBI, 1998). A sedentary lifestyle also contributes to the rate of obesity. Among African Americans, women of all ages report less regular exercise participation than white women, and men age 45 and older report less regular exercise than white women (American Obesity Association, 2002).

Risk Factors

Many factors contribute to obesity, including genetic, physiologic, psychologic, environmental, and sociocultural factors. Heredity may contribute as much as 25% to 40% of the risk for obesity (NHLBI, 1998). The inheritance of obesity does not usually follow a clear Mendelian pattern, and it is difficult to separate the role of environment from genetic factors. However, there is a strong correlation between the weight of adopted children and their biologic parents. Identical twins tend to have similar BMIs, whether raised together or apart, providing further evidence of a genetic link to obesity. While several genes that contribute to appetite and fat deposition have been identified, obesity as a purely genetic condition is rare (Kasper et al., 2005).

Physical inactivity is probably the most important factor contributing to obesity. Inactive people may consume fewer calories than active people and continue to gain weight due to lack of energy expenditure. Cultural and environmental factors such as labor-saving devices, reliance on the automobile for transportation, and increased time spent using the computer contribute to decreased energy expenditure among adults in the United States. Increased time spent watching television is seen as a major contributing factor to the increased incidence of obesity among children and adolescents (Kasper et al., 2005).

Environmental influences, such as an abundant and readily accessible food supply, fast-food restaurants, advertising, and vending machines, contribute to increased food intake. Sociocultural influences that contribute to obesity include overeating at family meals, rewarding behavior with food, religious and family gatherings that promote food intake, and sedentary lifestyles. Socioeconomic status also tends to correlate with the risk for overweight and obesity: In the United States, women with low incomes or low educational levels are more likely to be obese than those of higher socioeconomic status (NHLBI, 1998). The association between socioeconomic status and obesity is less clear in men.

Psychologic factors, such as low self-esteem, also play a role in obesity. Low self-esteem may precipitate unhealthy eat-

ing behaviors, and the resulting weight gain in turn may diminish self-image even further. A person may overeat as a result of anxiety, depression, guilt, or boredom or as a means of getting attention. Some experts characterize overeating as a food addiction and as a coping mechanism for stressful life events.

Overview of Normal Physiology

All body activities require energy, including activities of daily living, as well as those necessary to maintain cell and tissue function. **Nutrients** in food (or enteral or parenteral feedings) provide this energy and are the building blocks for growth and tissue repair. The body stores excess nutrients and energy (measured as kilocalories) to meet the body's needs when required nutrients are unavailable. This ability to store and release energy is important to maintaining body function. More than 70% of the energy expended each day goes to maintaining the **basal metabolic rate (BMR)**, essentially the "cost" (in kilocalories) of being alive. Physical activity accounts for only 5% to 10% of the energy spent daily.


Energy is primarily stored as fat in adipose tissue. Although mature fat cells (adipocytes) do not multiply, the immature cells in adipose tissue can multiply, particularly when exposed to estrogen during puberty, in late adolescence, during breast-feeding, and in middle-aged adults who are overweight. Fat cells store excess energy as **triglycerides**, formed from dietary fats and carbohydrates. The body breaks down the triglycerides in fat cells when needed to provide energy (Porth, 2005).

Pathophysiology

Obesity occurs when excess calories are stored as fat. It can result from excess energy intake, decreased energy expenditure, or a combination of both. The etiology of obesity is not, however, as simple as excess kilocalorie intake in relation to energy expenditure. The systems that regulate food intake, energy storage, and energy expenditure are complex and not fully understood.

Appetite, which affects food intake, is regulated by the central nervous system and by emotional factors. The hunger center in the hypothalamus stimulates appetite in response to stimuli such as hypoglycemia. As nutrient levels rise, the satiety center (also in the hypothalamus) sends the message to stop eating. Gastrointestinal filling and hormonal factors also signal *satiety* (a sensation of fullness). Appetite may have little relationship to hunger: People may eat to relieve depression or anxiety.

Several hormones are involved in regulating obesity, including thyroid hormone, insulin, and leptin (a peptide produced by fatty tissue that suppresses appetite and increases energy expenditure). Some studies suggest that leptin resistance is a cause of obesity. Insulin is associated with body fat distribution. The two major types of body fat distribution are upper body and lower body obesity.

Upper body obesity (also called *central obesity*) is identified by a waist-to-hip ratio of greater than 1 in men or 0.8 in women. (See Chapter 21  for a method to calculate the waist-to-hip ratio.) People with upper body obesity tend to have more intra-abdominal fat and higher levels of circulating free fatty acids (Porth, 2005). As a result, upper body obesity is associated with a greater risk of complications such as hypertension, abnormal

blood lipid levels, heart disease, stroke, and elevated insulin levels. Men tend to have more intra-abdominal fat than women, although women develop a central fat distribution pattern after menopause.

Lower body obesity (also known as *peripheral obesity*), in which the waist-to-hip ratio is less than 0.8, is more commonly seen in women. The risk for hyperinsulinemia, abnormal lipids, and heart disease is lower in people with lower body obesity than in those with upper body obesity. Lower body obesity may be more difficult to treat, however.

Complications of Obesity

As obesity increases, adverse consequences of obesity increase. Individuals with **morbid obesity** (greater than 200% ideal body weight) have a risk of dying that is 12 times that of people who are not obese (Kasper et al., 2005).

Obesity is a significant risk factor for cardiovascular disease, including hypertension, coronary heart disease (CHD), and heart failure. The prevalence of hypertension in obese men and women is approximately twice that in people with a BMI of less than 25 (NHLBI, 1998). The increases in blood pressure seen with obesity increase the risk for CHD and stroke. Approximately 60% of obese individuals have *metabolic syndrome*, including three or more of the following: increased waist circumference, hypertension, elevated blood triglycerides and fasting blood glucose, and low HDL cholesterol (Tierney et al., 2005). The metabolic syndrome is an identified risk factor for atherosclerosis and CHD. The Nurses' Health Study showed that the relative risk for CHD in women increases with a BMI of 25 or higher (NHLBI, 1998). Obesity also increases the risk for developing heart failure. Left ventricular muscle mass increases, and the ventricle dilates in obese individuals, possibly related to increased blood volume and cardiac output. Obesity-associated obstructive sleep apnea also contributes to the risk for heart failure.

Obesity increases the risk of insulin resistance and type 2 diabetes. Both weight gain in adulthood and abdominal (central) obesity are positively correlated with the risk for developing type 2 diabetes (NHLBI, 1998). It affects reproductive function in both men and women. Androgen (male sex hormone) levels are reduced in obese men; menstrual irregularities and polycystic ovarian syndrome (PCOS) are more common in obese women. PCOS is an additional risk factor for hyperinsulinemia and insulin resistance. Increased weight also increases the risk for developing gallstones in both men and women. The risk for developing several types of cancer, including colon, breast, and endometrial, increases in obesity. Increased weight places abnormal stress on joints, increasing the prevalence of joint pain and osteoarthritis, particularly in weight-bearing joints (especially the knee joints). Other health-related problems associated with obesity are listed in Table 22–1.

INTERDISCIPLINARY CARE



Because obesity has many contributing factors, its treatment is far more complex than just reducing the amount of food consumed. Treatment is an ongoing process requiring a number of

strategies. Most experts recommend an individualized program of exercise, diet, and behavior modification designed to meet the client's specific needs.

Diagnosis

Although body weight may be used to identify obesity, measures of body fat are more accurate. Males at ideal body weight have 10% to 20% body fat, whereas females at ideal body weight have 20% to 30% body fat.

- **Body mass index** is used to identify excess adipose tissue. BMI is calculated by dividing the weight (in kilograms) by the height in meters squared (m^2). See Box 22–1. BMI calculations may not as accurately reflect the extent of adipose tissue in people who are highly muscular (e.g., body builders) or in those who have lost muscle mass (e.g., older adults). Table 22–2 provides a tool for determining BMIs between 19 and 35.
- **Anthropometry** includes measurements of height, weight, bone size, and skinfold measurements to estimate subcutaneous fat. See Chapter 21 ∞ for more information about anthropometric measurements.
- **Underwater weighing (hydrodensitometry)** is considered the most accurate way to determine body fat. This technique involves submerging the whole body and then measuring the amount of displaced water.
- **Bioelectrical impedance** uses a low-energy electrical impulse to determine the percentage of body fat by measuring the electrical resistance of the body.
- **Waist circumference** is measured to determine body fat distribution. Men with a waist measurement of 40 inches (102 cm) or greater and women with a waist measurement of 35 inches (88 cm) or greater have a higher risk for complications of obesity.

Other diagnostic tests may be done to help identify a physiologic cause of obesity, as well as complications of obesity.

- A **thyroid profile**, including a T_3 total and T_3 uptake, T_4 free (FT_4) and T_4 total, free thyroxine index (FTI), and TSH, is done to rule out thyroid disease (see Chapter 18 ∞).
- **Serum glucose** is measured to identify coexisting diabetes mellitus.
- **Serum cholesterol** is measured to assess for elevated levels.
- A **lipid profile** is ordered; high-density lipoprotein (HDL) levels may be reduced in obese clients, whereas low-density lipoprotein (LDL) levels are elevated.
- An **electrocardiogram (ECG)** is performed to detect effects of obesity on the heart, such as rate or rhythm disruptions, myocardial infarction, or heart enlargement.

BOX 22–1 Calculating Body Mass Index (BMI)

BMI = weight (kg)/height² (m^2)
 Normal = BMI 18.5–24.9 kg/m^2
 Overweight = BMI 25–29.9 kg/m^2
 Obese = BMI > 30 kg/m^2
 Extreme obesity = BMI > 40 kg/m^2

TABLE 22–2 Body Mass Index Table for BMIs 19 to 35

BMI	NORMAL					OVERWEIGHT					OBESE						
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
HEIGHT (INCHES)	BODY WEIGHT (POUNDS)																
58	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167
59	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185
62	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204
65	114	120	126	132	136	144	150	156	162	168	174	180	186	192	198	204	210
66	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230
69	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243
71	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250
72	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287

Source: National Institutes of Health, National Heart, Lung, and Blood Institute, North American Association for the Study of Obesity. (2000). *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. Bethesda, MD: NIH.

Medications

Many prescription and over-the-counter drugs have been used to help people lose weight. When used in combination with diet and exercise, drugs can help promote weight loss. Their long-term efficacy, however, is questionable; rebound weight gain following the cessation of drug use is common. In addition, tolerance, addiction, and side effects may occur. These products are usually recommended only as an adjunct to therapy and only when traditional therapies have been unsuccessful.

Amphetamines (which have a high potential for abuse) and nonamphetamine appetite suppressants (such as phentermine) may be used for a short time to promote weight loss. Phentermine is believed to act directly on the appetite control center in the central nervous system (CNS). As with amphetamines, nonamphetamine appetite suppressants stimulate the CNS, with resulting increased alertness, nervousness, and insomnia. They reduce fatigue, and can interfere with sleep. They are used with caution in clients with preexisting heart disease, because they can increase blood pressure and heart rate and cause anginal pain.

Sibutramine (Meridia) is an appetite suppressant that acts on the CNS. Sibutramine also may increase the metabolic rate, promoting weight loss. It has the additional benefit of lowering cholesterol and triglyceride levels. Sibutramine increases both the pulse rate and blood pressure, potentially limiting its ap-

propriateness for use in clients with hypertension, CHD, or heart failure.

Orlistat (Xenical) has a different mechanism of action: It inhibits fat absorption from the GI tract, leading to weight loss. It has the added benefit of lowering blood glucose and cholesterol. The adverse effects of orlistat relate to its inhibition of fat absorption: oily stools, flatulence, and fecal urgency. These effects tend to diminish when dietary fat intake is limited. See the Medication Administration box on page 634 for the nursing implications of these drugs.

Over-the-counter products such as phenylpropanolamine, benzocaine, and bulk-forming agents are commonly used in weight management efforts. Phenylpropanolamine (Acutrim, Dexamtrim) is an adrenergic agent that suppresses appetite. This product is contraindicated in clients with hypertension, CHD, diabetes mellitus, and thyroid disease. Methylcellulose and other bulk-forming products may decrease appetite by producing a sensation of fullness. Clients taking these products may experience flatulence or diarrhea and may need to increase fluid intake.

Treatments

Successful treatment of obesity (sustained achievement of normal body weight without adverse consequences) is rarely achieved. Treatment focuses on reducing the health risks associated with



MEDICATION ADMINISTRATION Drugs to Treat Obesity

APPETITE SUPPRESSANTS

- Phentermine (Adipex-P, Fastin, Ionamin, Obestin-30, Oby-Tim, others)
- Sibutramine (Meridia)

Phentermine acts directly on the appetite-control center in the CNS to suppress the appetite and reduce hunger. Sibutramine reduces hunger and increases sensations of satiety by inhibiting the uptake of serotonin, norepinephrine, and dopamine. These drugs may be used to treat obesity in clients with a BMI of >30 kg/m² and obese clients who have risk factors such as diabetes or hypertension.

Nursing Responsibilities

- Assess for contraindications, such as pregnancy or lactation, use of other appetite suppressants, impaired liver or kidney function, history of CHD, or alcohol abuse.
- Regularly monitor blood pressure and heart rate during treatment. Increases may indicate need to reduce dose or discontinue treatment.

Health Education for the Client and Family

- Take as directed; do not exceed recommended dose. Do not take if you may be pregnant or are nursing.
- Take your last dose no later than 4 P.M. to avoid insomnia.
- You may experience difficulty sleeping, nervousness, or palpitations while taking this drug.

- Increase your fluid intake to reduce possible side effects of dry mouth and constipation.
- This drug does not replace diet and exercise for weight loss; continue to follow your prescribed regimen.

LIPASE INHIBITOR

- Orlistat (Xenical)
- Orlistat inhibits lipases necessary for the breakdown and absorption of fat, thus decreasing the absorption of dietary fat. Its action is primarily local, within the GI tract, with few systemic effects.

Nursing Responsibilities

- Administer with meals or up to 1 hour following a meal.
- Provide a fat-soluble vitamin supplement (A, D, E, and K) daily. Separate administration time from orlistat by at least 2 hours.

Health Education for the Client and Family

- Take as directed; do not increase dose. You may skip a dose if you do not consume a meal.
- Use in conjunction with a low-calorie, low-fat diet.
- Common gastrointestinal side effects include oily or fatty stools, flatulence, oily discharge, or frequent stools with difficulty controlling defecation. These side effects may diminish with time or increase if a meal high in fat is consumed.
- Notify your healthcare provider if you become pregnant while taking this medication.

obesity by changing both eating and exercise habits. A pound of body fat is equivalent to 3500 kcal. To lose 1 pound, therefore, a person must reduce daily caloric intake by 500 kcal for 7 days or increase activity enough to burn the equivalent kilocalories. A weight loss goal of 1 to 2 pounds per week and a 10% reduction in body weight in 6 months of therapy is recommended (NHLBI, 2000). A combination of physical activity, dietary therapy, behavior modification, pharmacology, and, in some cases, surgery is required to achieve and maintain weight loss (Table 22–3).

EXERCISE Exercise is a critical element in weight loss and maintenance. Physical activity increases energy consumption and pro-

motes weight loss while preserving lean body mass. Physical activity improves physical fitness, decreases appetite, promotes self-esteem, and increases the basal metabolic rate. An exercise or activity program should reflect the client's physical condition, interest, lifestyle, and abilities. Evaluation by a healthcare practitioner is important before beginning an exercise program. The practitioner instructs the client to increase the duration and intensity of activity and to stop exercising and report symptoms if chest pain or shortness of breath occurs. An aerobic exercise program of 30 to 40 minutes of exercise five or more days a week promotes weight loss while reducing adipose tissue, increasing lean body mass, and promoting long-term weight control. Table 22–4 presents examples of moderate activities, that when performed at the

TABLE 22–3 Treatment Recommendations for Overweight and Obesity

TREATMENT	BMI				
	25–26.9	27–29.9	30–34.9	35–39.9	≥40
Diet, exercise, and behavior modification	With two or more comorbidities ¹	With two or more comorbidities ¹	Yes	Yes	Yes
Pharmacotherapy ²		With two or more comorbidities ¹	Yes	Yes	Yes
Surgery			With 2 or more comorbidities ¹		

¹For example, hypertension, hyperlipidemia, diabetes, and other obesity-related complications.

²Considered when 6 months of combined therapy has not produced a loss of 1 pound per week.

Source: Adapted from National Institutes of Health, National Heart, Lung, and Blood Institute, North American Association for the Study of Obesity. (2000). *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. Bethesda, MD: NIH.

TABLE 22–4 Moderate Physical Activities to Use Approximately 150 kcal/day

COMMON CHORES	SPORTS & RECREATION	
Washing and waxing a car: 45–60 min	Playing volleyball: 45–60 min	Less vigorous, more time
Washing windows or floors: 45–60 min	Playing touch football: 45 min	
Gardening: 45–60 min	Walking 1¼ miles: 35 min	
Wheeling self in wheelchair: 30–40 min	Bicycling 5 miles: 30 min	
Pushing a stroller 1½ miles: 30 min	Dancing fast (social): 30 min	
Raking leaves: 30 min	Swimming laps: 20 min	
Walking 2 miles: 30 min	Playing basketball: 15–30 min	
Shoveling snow: 15 min	Jumping rope: 15 min	
Stairwalking: 15 min	Running 1½ miles: 15 min	More vigorous, less time

Source: National Institutes of Health, National Heart, Lung, and Blood Institute, North American Association for the Study of Obesity. (2000). *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. Bethesda, MD: NIH.

identified intensity and duration, will use approximately 150 kcal per day or about 1000 kcal per week.

NUTRITION The diet is planned to create a daily 500- to 1000-kcal deficit. Ideally, the diet should be low in kilocalories and fat and contain adequate nutrients, minerals, and fiber. The client should eat regular meals with small servings. A gradual, slow weight loss of no more than 1 to 2 pounds per week is recommended. For most people, this means a diet of 1000 to 1200 kcal/day for most women, and 1200 to 1600 kcal/day for men. Fewer than 1200 kcal each day may lead to loss of lean tissue and nutritional deficiencies. The recommended diet generally is low in fat and high in dietary fiber (Table 22–5). Excessive calorie restrictions can lead to failure to follow the prescribed diet, feelings of guilt, and overeating. “Yo-yo” dieting (repeated cycles of weight loss and gain) may lead to a metabolic deficiency that makes subsequent weight loss efforts increasingly difficult. Therefore, it is critical that dieters take any weight loss effort seriously and include plans for long-term maintenance. The best approach is to modify dietary intake without severe restrictions, eating a well-balanced, low-fat diet

and developing improved eating habits. Table 22–6 provides sample daily menus for a reduced kcal diet.

Very low calorie diets (VLCDs) are generally reserved for clients who have a BMI greater than 30 (Weight-Control Information Network [WIN], 2003b). This type of program offers a protein-sparing modified fast (400 to 800 kcal/day or less) under close medical supervision. In a typical program, the client consumes 45 to 70 g of high-quality protein, 30 to 50 g of carbohydrate, and about 2 g of fat per day for a 1- to 2-month period. Exercise, nutrition, and behavior modification counseling should accompany the diet. The client generally experiences a dramatic and rapid weight loss while maintaining lean body mass. Suppression of hunger brought on by ketone production associated with fat metabolism is an added benefit of the diet. Complications generally are minor, and the benefits include decreased blood pressure, blood glucose, and cholesterol and triglyceride levels, along with improved exercise tolerance (Kasper et al., 2005). VLCDs may not be appropriate for use in people over age 50 due to normal loss of lean body mass and adverse effects of the diet. Adverse effects generally are minor, but could include fatigue, constipation, nausea, diarrhea, and gallstone formation (WIN, 2003b).

TABLE 22–5 Recommended Nutrient Intake for Weight Loss

NUTRIENT	RECOMMENDED INTAKE
Calories	1000 to 1600 per day or approximately 500 to 1000 less than usual daily intake
Total fat	30% or less of total calories
Saturated fats	10% or less of total calories
Cholesterol	< 300 mg/day
Protein (from plant and lean animal sources)	Approximately 15% of total calories
Carbohydrate (complex carbohydrates from vegetables, fruits, and whole grains)	55% or more of total calories
Fiber (e.g., oat bran, legumes, barley, most fruits and vegetables)	20 to 30 g/day
Sodium chloride	< 2.4 g sodium or 6 g sodium chloride/day
Calcium	1000 to 1500 mg/day

Source: Adapted from National Institutes of Health, National Heart, Lung, and Blood Institute, North American Association for the Study of Obesity. (2000). *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. Bethesda, MD: NIH.

TABLE 22–6 Sample Menus for a Reduced Kilocalorie Diet

	TRADITIONAL AMERICAN	REDUCED CARBOHYDRATE	SOUTHERN CUISINE	ASIAN AMERICAN	MEXICAN AMERICAN
Breakfast	Whole-wheat toast with jelly, 1 slice High-fiber cereal, 1 cup Milk 1%, 1 cup Orange juice, 6 oz Coffee	Whole-wheat toast with low-fat cream cheese Egg substitute, ½ cup, scrambled Vegetable juice, 1 cup Coffee	Oatmeal, ½ cup, prepared with 1% milk Milk 1%, ½ cup English muffin with low-fat cream cheese Orange juice, 6 oz Coffee	Banana, 1 small Whole-wheat toast with soft margarine, 2 slices Milk 1%, 1 cup Orange juice, 6 oz Tea	Farina, ½ cup prepared with 1% milk White toast with soft margarine and jelly Cantaloupe, 1 cup Orange juice, 1 cup Coffee
Lunch	Roast beef sandwich: 2 slices whole-wheat bread, 2 oz lean roast beef, lettuce, tomato, and low-kilocalorie mayonnaise Apple, 1 medium Water	Salad greens with 2 oz sliced turkey, 1 oz low-fat cheese, and 1 oz low-fat salad dressing Apple, 1 medium Water	Baked chicken, no skin, 2 oz Mixed vegetable salad with 2 tsp oil and vinegar dressing White rice, ½ cup Baking powder biscuit, 1 small with soft margarine Water	Beef broth, ½ cup Chinese noodle and beef salad: 3 oz roast beef, 1 tsp peanut oil, low-sodium soy sauce, carrots, zucchini, onion, and ¼ soft Chinese noodles Apple, 1 medium Tea	Beef enchilada: 2 corn tortillas, 2½ oz lean roast beef, onion, tomato, lettuce, chili peppers, and ¼ cup refried beans (prepared with vegetable oil) Carrots, celery Milk 1%, ½ cup Water
Dinner	Salmon, 3 oz Baked potato, ¾ medium Soft margarine, 1 tsp Green beans, ½ cup Carrots, ½ cup White dinner roll, 1 medium Ice milk, ½ cup Iced tea, unsweetened Water	Salmon, 3 oz Baked sweet potato, 1 small Soft margarine, 1 tsp Green beans, 1 cup Orange, 1 medium Ricotta cheese, ¼ cup, with artificial sweetener and ¼ tsp flavoring extract Iced tea, unsweetened Water	Lean roast beef, 3 oz Beef gravy (water-based), 1 Tbsp Turnip greens Baked sweet potato, 1 small, with soft margarine, ground cinnamon, and 1 tsp brown sugar Corn bread, ½ medium slice Honeydew melon, ¼ medium Sweetened iced tea	Pork stir-fry with vegetables: 2 oz pork cutlet, 1 tsp peanut oil, low-sodium soy sauce, broccoli, carrots, mushrooms Steamed white rice, 1 cup Tea, unsweetened	Chicken taco: 1 corn tortilla, 2 oz chicken breast without skin, 1 oz low-fat cheddar cheese, 2 Tbsp guacamole, and salsa Corn, ½ cup Spanish rice without meat, ½ cup Banana Coffee
Snack	Popcorn, 2½ cups with ½ tsp margarine	Apple, 1 small Low-fat cheese stick, 1	Saltine crackers, unsalted tops, 4 Mozzarella cheese, part skim, 1 oz	Almond cookies, 2 Milk 1%, ¾ cup	

BEHAVIOR MODIFICATION Behavior modification is a critical component of successful weight management. Strategies such as keeping food records, eliminating cues that precipitate eating, and changing the act of eating are often helpful.

Recording food intake, amount, location of eating, and situations that induce eating often help the dieter gain self-control. These strategies are often most effective when used in combination with other behavior modification approaches.

Researchers have found that most overweight people are stimulated to eat by external cues, such as the proximity to food and the time of day. In contrast, hunger and satiety are the cues that regulate eating in adults of normal weight. Strategies to control food cues include keeping food out of view, eliminating snack foods, and eating only in designated areas. See Box 22–2 for a list of behavior modification strategies.

Other behavior modification approaches focus on helping clients examine factors that affect eating behaviors. Examining

lifestyle, personality, and environment helps the client understand eating behaviors and their consequences. The goal is to empower the person who is stimulated to eat to choose activities that are not related to food.

Social support and group programs such as Weight Watchers, Overeaters Anonymous, and Take Off Pounds Sensibly (TOPS) promote weight loss success through peer support. Most organized programs require participants to pay a fee, which may improve compliance.

SURGERY Surgical treatment of obesity (*bariatric surgery*) generally is limited to morbidly obese clients (BMI of over 40 kg/m² or 200% ideal body weight) who are unable to lose weight through diet and exercise or who have serious obesity-related problems such as metabolic syndrome, hypertension, or heart disease (WIN, 2004). In addition, clients must be able to tolerate surgery and be free of addiction to alcohol or other

BOX 22–2 Behavioral Change Strategies for the Obese Client**Controlling the Environment**

- Purchase low-calorie foods.
- Shop from a prepared list and on a full stomach.
- Keep all foods in the kitchen.
- Store all foods in the refrigerator or in the cabinets in opaque containers.
- Prepare exact portions of food to eliminate leftovers.
- Eat all foods in the same place, avoid eating in the kitchen.
- Avoid eating when watching television or reading.
- Reduce frequency of eating out at restaurants, parties, and picnics.

Controlling Physiologic Responses to Food

- Eat slowly by taking small bites, allowing 20 minutes for a meal.
- Eat a salad or drink a hot beverage before a meal.

- Chew each bite thoroughly and slowly.
- Put eating utensils or food down between bites.
- Concentrate on the eating process, savor the food.
- Stop eating with the first feelings of fullness.

Controlling Psychologic Responses to Food

- Appreciate the aesthetic experience of eating.
- Use attractive dinnerware, and prepare a formal setting for eating.
- Use small plates and cups to make servings of food look larger.
- Concentrate on conversations and socialization during the meal.
- Use nonfood rewards for meeting a goal.
- Acknowledge small successes and improvements in all behavior.
- Substitute other activities for eating (e.g., reading, exercise, hobbies).

drugs. A thorough psychologic evaluation is done before surgery. The benefits of surgery include major weight loss and improved blood pressure, plus a reduced risk of diabetes, sleep apnea, angina, heart failure, blood lipid levels, and venous disease (Kasper et al., 2005). Bariatric surgery, however, is not without risk, and the decision to undergo surgery is a significant one.

The most common bariatric surgical procedures used in the United States restrict stomach capacity, limiting food intake, and bypass a portion of the small intestine to restrict absorption of calories and nutrients. In the Roux-en-Y gastric bypass (RGB, Figure 22–1A ■), a small stomach pouch is created to restrict food intake. A Y-shaped section of the jejunum is then attached to the pouch to allow food to bypass the lower stomach and duodenum. As a result, calorie and nutrient absorption is limited. A more complex procedure, the biliopancreatic diversion (BPD), carries a higher risk of nutritional deficiencies and is used less frequently. In BPD, a portion of the stomach is removed to reduce its capacity. The duodenum and jejunum are bypassed by connecting the ileum directly to the stomach pouch or just distal to the pyloric valve.

These combined restrictive/malabsorptive surgeries have the advantage of resulting in rapid weight loss that is maintained over time. Many clients maintain a 60% to 70% weight

loss for 10 years or more following RGB surgery (WIN, 2004). They also help improve obesity-associated health problems such as type 2 diabetes, hypertension, and sleep apnea. Because these procedures allow food to bypass the duodenum and jejunum, nutrient deficiencies are common, particularly of iron, calcium, vitamin B₁₂, and, possibly, the fat-soluble vitamins.

Restrictive procedures, which are safer but generally less effective in the long term, include adjustable gastric banding (AGB) and the vertical banded gastroplasty (VBG). In AGB (Figure 22–1B), a hollow band of silicone rubber is placed around the upper (proximal) portion of the stomach. The band is inflated with saline solution to create a small stomach pouch with a narrow passage through to the rest of the stomach. The amount of band inflation can be adjusted using a port implanted under the skin. The VBG (Figure 22–1C) uses both a band and staples to create a small stomach pouch. Both procedures may be performed laparoscopically and can be reversed if necessary. Few nutritional deficiencies are associated with restrictive bariatric procedures. Vomiting is a common postoperative risk with restrictive procedures. The band may slip or break, necessitating a return to surgery. About 15% to 20% of clients undergoing VBG procedures may require a second procedure. Because of this and

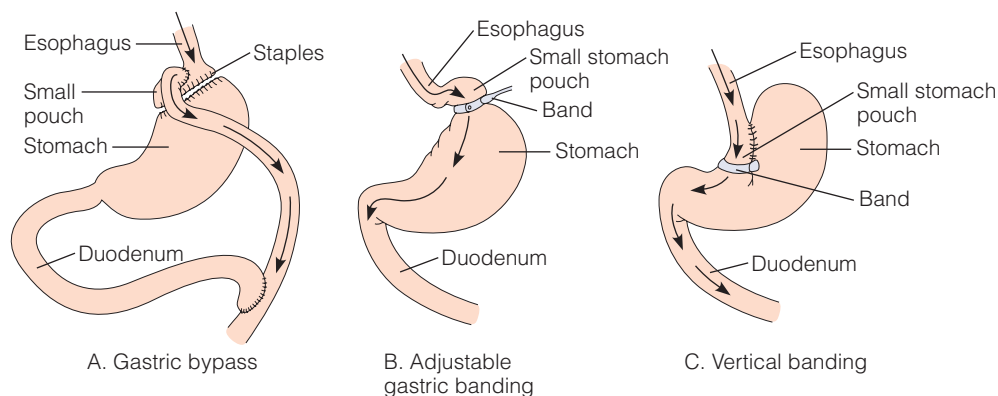


Figure 22–1 ■ Types of surgical procedures to treat obesity. A. Roux-en-Y gastric bypass surgery; B. Adjustable gastric banding. C. Vertical banded gastroplasty.

the increased complexity of this procedure, it is performed less commonly than AGB (WIN, 2004). While clients typically lose about 50% of their excess body weight within the first year after these procedures, less than one-quarter maintain that weight loss over a 10-year period (WIN, 2004).

Although the risk for postoperative complications is high, the mortality rate for bariatric procedures is low (less than 1% for restrictive surgeries and up to 5% for combination procedures). Possible postoperative complications include anastomosis leak with peritonitis, abdominal wall hernia, gallstones, wound infections, deep venous thrombosis, nutritional deficiencies, and gastrointestinal symptoms (Tierney et al., 2005). Dumping syndrome, which can be precipitated by a meal high in simple carbohydrates, may develop following combined bariatric surgeries such as RGB and BPD. In dumping syndrome, stomach contents move rapidly through the small intestine, drawing fluid into the intestine by osmosis. The client experiences nausea, bloating, abdominal pain, weakness, sweating, and possibly syncope. See Chapter 23 ∞ for more information about dumping syndrome.

Nursing care for the client who has undergone bariatric surgery is substantially the same as for a client who has undergone a gastric resection. See Chapter 23 ∞ for more information about gastric resection and associated nursing care. Bariatric surgery clients, however, have some additional nursing care needs related to the effects of the surgery on gastrointestinal function. See the box below.

Maintaining Weight Loss

Losing weight and maintaining that loss are two separate but related issues. Most experts agree that the majority of dieters regain lost weight within a 2-year period. The potential risks associated

with regaining weight make maintenance a critical issue. Clients are encouraged to continue exercise, self-monitoring, and treatment support. Long-term weight loss and maintenance mean a lifelong commitment to significant lifestyle changes, including food and eating habits, activity and exercise routines, and behavior modification. Failure to maintain weight loss can lead to feelings of inadequacy, powerlessness, and hopelessness.



NURSING CARE

Health Promotion

Maintaining a healthy weight throughout the life span begins in childhood. Obese children and teenagers become obese adults. Promote healthy eating, including a diet rich in whole grains, fruits, and vegetables and low in fat. The USDA Food Guide Pyramid (Chapter 2 ∞) and the Healthy Eating Pyramid provide visual guidance for appropriate food choices to maintain a healthy, well-balanced diet. Encourage all children and adults to maintain an active lifestyle, engaging in at least 30 minutes of aerobic activity daily. Encourage parents to limit time children spend watching television, using the computer, and playing video games. Discuss the effects of smoking and excess alcohol use on nutrition and activity.

Adults commonly gain about 20 pounds between early and middle adulthood. Encourage clients to reduce the amount of calories consumed as energy needs change.

Assessment

Collect the following data through the health history and physical examination (see Chapter 21 ∞):

MEETING INDIVIDUALIZED NEEDS Recommended Diet Following Bariatric Surgery

Clients undergoing bariatric surgery to restrict stomach capacity and/or nutrient absorption have unique learning needs to prevent discomfort and nutritional complications after surgery:

- A liquid diet generally is prescribed in the initial postoperative period. Fruit juices and other concentrated sugars are avoided. *The client is at risk for developing dumping syndrome in the early postoperative period; simple carbohydrates increase the risk.*
- When clear liquids are tolerated, nonfat or low-fat milk is added to the diet. Soy milk may be used if milk intake results in bloating and gas. *Milk provides a protein source. Fat-free milk or nonfat milk is recommended to reduce the risk of diarrhea. People with a lactase deficiency may not be able to digest the natural lactose sugar in milk.*
- Pureed foods are introduced into the diet in approximately 1 to 2 weeks, and it is advanced to include soft foods within about 1 month after surgery. *Gradual increases in food textures allow the restricted stomach to adapt.*
- Increasing fluid intake and maintaining protein intake are priorities during the healing process. *Fluid intake is necessary to maintain fluid balance, proteins for nitrogen balance and tissue healing.*

- Instruct clients who have undergone restrictive surgery to chew food very well and slow their pace of eating. *Failure to thoroughly chew food and eat slowly can lead to vomiting and abdominal discomfort. Without behavior modification, protein-calorie malnutrition can develop.*
- Advise the client to take an adult multiple vitamin and mineral supplement after restrictive surgery. *Because the overall quantity of food consumed is reduced, the client may develop a micronutrient deficiency.*
- Clients who have had combination restrictive/malabsorptive surgery generally require supplements of folate, sublingual vitamin B₁₂, and calcium, in addition to an adult multivitamin. Iron supplement may be necessary if anemia develops (see Chapter 34 ∞). *Intestinal bypass interferes with absorption of many vitamins and minerals usually absorbed in the duodenum or jejunum.*
- Advise clients to avoid sugar and concentrated sweets (fruit juice, sugar-containing beverages, honey) and to separate consumption of solid foods and liquids by at least 30 minutes. *Concentrated sugars can precipitate dumping syndrome.*

Source: Adapted from Nutritional Considerations after Bariatric Surgery (2003), by K. Elliot, *Critical Care Nursing Quarterly*, 26(2), 133–138.

- **Health history:** Risk factors; current and usual weight; recent weight gains or losses; perception of weight and effect on health; usual diet and food intake; exercise/activity patterns; prior weight loss efforts and results; current medications; co-existing disorders such as cardiovascular disease and diabetes; tobacco use; family history of overweight, diabetes, and weight-related morbidity.
- **Physical examination:** Vital signs; weight and height; skin-fold measurements; waist-to-hip ratio; BMI; inspect skin under the breasts and abdominal folds.

PRACTICE ALERT

Use of an inappropriate size sphygmomanometer is a common source of error in measuring blood pressure in obese clients. Choose a cuff on which the width of the bladder is 40% of the circumference of the arm and the length of the bladder is sufficient to cover at least 65% of the arm circumference.

Nursing Diagnoses and Interventions

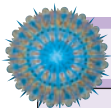
Nursing care for overweight and obese clients is community based and holistic, focusing on both physiologic and psycho-

logic responses to weight and appearance. See below for a Nursing Care Plan for the client with obesity.

Imbalanced Nutrition: More than Body Requirements

Although many factors contribute to obesity, it always involves an imbalance of kcal consumption to energy expenditure.

- Encourage the client to identify the factors that contribute to excess food intake. *Identification of cues to eating helps the client eliminate or reduce these cues.*
- Establish realistic weight loss goals and exercise/activity objectives. *Small, reasonable goals, such as loss of 1 to 2 pounds per week, increase the likelihood of success.*
- Assess the client's knowledge and discuss well-balanced diet plans. Provide necessary teaching about diet. *Knowledge empowers the client to participate and make appropriate diet choices.*
- Discuss behavior modification strategies, such as self-monitoring and environmental management. *Behavior modification, diet, and exercise are critical to promoting successful, long-term weight loss.*



NURSING CARE PLAN A Client with Obesity

Sam Elliott, age 57, has gained 30 pounds since his retirement 2 years ago. The most active thing he does each day is "puttering around" and "walking to the end of the driveway to get the mail." His diet includes juice, oatmeal, muffin, and coffee with cream for breakfast; donuts and coffee with friends midmorning; a bologna-and-cheese sandwich with chips and a root beer for lunch; and cheese, crackers, and wine before a dinner of meat, potatoes, vegetables, and dessert. He tells the nurse, "I have never had to diet. I just don't know how to get this weight off."

ASSESSMENT

Mr. Elliott is 5' 8" (173 cm) tall and weighs 201 lb (91.2 kg). His BMI is 30.1 kg/m². His cholesterol is 240 mg/dL (normal 150 to 200 mg/dL) with an HDL of 37 mg/dL (normal male value > 45 mg/dL) and an LDL of 180 mg/dL (normal <130 mg/dL). His BP is 138/90. His fasting blood glucose is normal at 103 mg/dL. His ECG shows normal sinus rhythm. He reports fatigue and shortness of breath with activity. His healthcare provider has advised a weight loss of 30 pounds and a regular exercise program.

DIAGNOSES

- *Imbalanced Nutrition: More than Body Requirements* related to food intake in excess of energy expenditure
- *Risk for Ineffective Therapeutic Regimen Management* related to knowledge deficit
- *Activity Intolerance* related to sedentary lifestyle

EXPECTED OUTCOMES

- Lose 1 pound each week.
- Walk 30 minutes 5 days each week.
- Verbalize an understanding of the relationship between weight loss, weight control, and exercise.
- Identify behavior modification strategies to avoid overeating.
- Identify support systems for behavior modification.

PLANNING AND IMPLEMENTATION

- Assess weight and blood pressure once or twice each week.
- Discuss current eating habits and strategies to reduce fat and calorie intake.
- Discuss cues that promote eating. Identify strategies to eliminate or reduce eating cues.
- Teach to keep a food diary to examine and change eating habits.
- Discuss the role of regular exercise in weight loss and weight control. Instruct to maintain an exercise record to track the intensity and duration of activity.
- Discuss lifestyle and behavior modification strategies to promote successful weight loss and control.

EVALUATION

Two weeks after changing his diet and beginning to exercise, Mr. Elliott has lost 2 pounds. He has maintained a food diary. He has identified boredom as a cue to eating. In light of that fact, he has started volunteering at the local hospital, where he is working with children. He is walking for 30 minutes 5 days a week. He plans to increase his activity periods to 45 minutes. He verbalizes commitment to a lifelong plan of exercising and eating a low-fat diet. His BP has ranged from 132/76 to 136/84. He plans to have the employee health nurse at the hospital check his weight and BP each week and to join Weight Watchers for ongoing support.

CRITICAL THINKING IN THE NURSING PROCESS

1. What are some possible pathophysiologic bases for Mr. Elliott's abnormal cholesterol, HDL, and LDL levels?
2. Develop a teaching plan for a group of overweight men and women.
3. Identify potential barriers to losing weight and strategies to reduce or eliminate these barriers.

See Evaluating Your Response in Appendix C.

- Monitor weight loss, blood pressure, and laboratory data, including blood glucose and lipid levels. *Continuing assessment not only is important to evaluate the safety of weight loss strategies, but also to reinforce positive benefits of weight loss.*

Activity Intolerance

Obese clients may experience excess fatigue, tachycardia, and shortness of breath with activity due to the physiologic effects of excess weight as well as a sedentary lifestyle. A medical evaluation may be needed before beginning an exercise program.

- Assess current activity level and tolerance of that activity. Assess vital signs. *This provides baseline information to plan an activity program and assess response to that activity.*
- After medical clearance, plan with the client a program of regular, gradually increasing exercise. Consider a consultation with an exercise physiologist. *An individualized exercise program promotes activities within the client’s physical capabilities.*

Ineffective Therapeutic Regimen Management

Most overweight or obese clients experience some difficulty integrating all the components of a weight loss program into a daily routine. For a weight loss and maintenance program to be successful, the overweight client must modify dietary intake in a world of daily temptations. There may be many obstacles to exercise, including a busy schedule, activity intolerance, impaired physical mobility, lack of equipment, and the embarrassment of being fat.

- Discuss ability and willingness to incorporate changes into daily patterns of diet, exercise, and lifestyle. *This provides data from which to set realistic goals with the client.*
- Help the client identify behavior modification strategies and support systems for weight loss and maintenance. *Weight loss and maintenance are most successful if the client establishes lifestyle patterns that promote interest and motivation and thus exercise and diet management. Family and social support is critical to successful adherence to the therapeutic regime.*
- Have the client establish strategies for dealing with “stress” eating or interruptions in the therapeutic regime. *A sense of failure associated with overeating or lack of exercise can lead to further overeating. Identifying positive strategies to deal with these situations promotes self-acceptance and limits self-punishment through overeating.*

Chronic Low Self-Esteem

Although many obese clients may have accepted their weight and body appearance on some level, most overweight and obese individuals verbalize the experience of “fat prejudice” in their family, workplace, or community. Obese clients may experience ridicule, prejudice, and health problems attributed to being “fat.” These experiences, coupled with day-to-day problems such as finding attractive clothing or a chair large enough to sit on can affect self-esteem. Many clients report that “fat” jokes or comments contribute to a sense of negative self-worth.

- Encourage the client to verbalize the experience of being overweight, and validate the client’s experience. *This provides baseline data to use in developing individualized interventions to address self-esteem issues.*

- Set small goals with the client and offer positive feedback and encouragement. *Small goals provide more opportunities for success. Positive feedback and encouragement provide a comfortable environment in which to develop self-esteem.*
- Refer for counseling as appropriate. *Many clients benefit from counseling for issues related to self-esteem.*

Using NANDA, NIC, and NOC

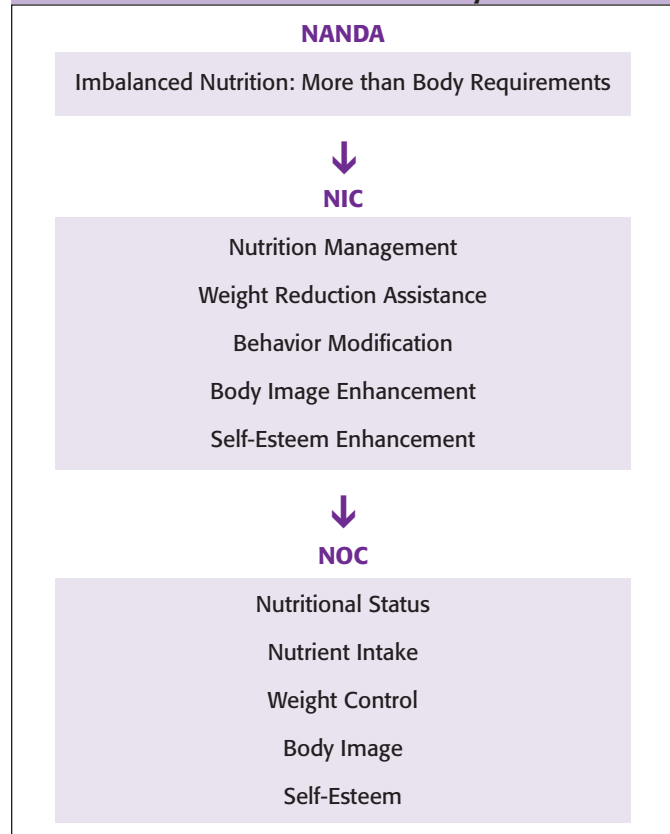
Chart 22–1 shows links between NANDA nursing diagnoses, NIC, and NOC for obese clients.

Community-Based Care

Weight reduction usually occurs in community-based settings. Weight loss and maintenance require a long-term commitment by the client, family, and support systems. Address the following topics with the client and family:

- Lifestyle changes are more effective than diets. Fad diets promote rapid weight loss but often are not nutritionally sound or may be difficult to maintain for a lifetime.
- All household members should consume a diet that is nutritionally sound, low in fat, and high in fiber.
- Establish realistic weight loss goals and a system of nonfood rewards for achieving each goal.

NANDA, NIC, AND NOC LINKAGES
CHART 22–1 The Client with Obesity



Data from *NANDA’s Nursing Diagnoses: Definitions & Classification 2005–2006* by NANDA International (2005), Philadelphia; *Nursing Interventions Classification (NIC)* (4th ed.) by J. M. Dochterman & G. M. Bulechek (2004), St. Louis, MO: Mosby; and *Nursing Outcomes Classification (NOC)* (3rd ed.) by S. Moorhead, M. Johnson, and M. Maas (2004), St. Louis, MO: Mosby.

- Identify an “exercise buddy” or support system to promote continued physical activity.
- Expect occasional failures. Resume prescribed diet and exercise routine as soon as possible; the goal is long-term weight management.
- Community resources such as Weight Watchers, TOPS, or healthcare-based programs provide information, strategies, and support for successful weight management.

THE CLIENT WITH MALNUTRITION

Malnutrition results from inadequate intake of nutrients. There may be a lack of major nutrients (calories, carbohydrates, proteins, and fats) or micronutrients such as vitamins and minerals. Malnutrition may be caused by inadequate nutrient intake; impaired absorption and use of nutrients; loss of nutrients due to diarrhea, hemorrhage, or renal failure; or increased metabolic needs (e.g., infection or physiologic stressors).

Incidence and Prevalence

Malnutrition is a widespread cause of disease and mortality throughout the world. It is endemic in regions affected by famine. Groups at risk for malnutrition in the United States include the young, poor, elderly, homeless, low-income women, and ethnic minorities. Even when food is plentiful, clients may be undernourished because of poor food choices.

It is estimated that approximately half of all hospitalized clients are malnourished (Kasper et al., 2005). Malnutrition may be present on admission or develop as a result of surgery or serious illness. Malnutrition increases both mortality and the incidence of complications in both medical and surgical clients. The incidence of malnutrition is even higher in long-term care residents, where up to 85% of residents may be malnourished (DiMaria-Ghalili & Amella, 2005). See Box 22–3 for conditions commonly associated with malnutrition.

Risk Factors

Risk factors for malnutrition include the following:

- Age—older adults are at greater risk for malnutrition due to a variety of factors (see the Meeting Individualized Needs box on page 642)
- Poverty, homelessness, inadequate food storage and preparation facilities
- Functional health problems that limit mobility or vision
- History of weight loss of more than 20% of usual weight

BOX 22–3 Conditions Associated with Malnutrition

- | | |
|-----------------------------|------------------------------|
| ■ Acute respiratory failure | ■ Eating disorders |
| ■ Aging | ■ Gastrointestinal disorders |
| ■ AIDS | ■ Neurologic disorders |
| ■ Alcoholism | ■ Renal disease |
| ■ Burns | ■ Short bowel syndrome |
| ■ COPD | ■ Surgery |
| ■ Dementia | ■ Trauma |

- Oral or gastrointestinal problems that affect food intake, digestion, and absorption
- Inability to eat for 5 or more days
- Chronic pain or chronic diseases such as pulmonary, cardiovascular, renal, or endocrine disorders, or cancer
- Dementia, mental health disorders
- Medications or treatments that affect appetite
- Alcohol or drug addiction
- Acute problems such as infection, surgery, or trauma

Pathophysiology

Carbohydrates and fats in the diet are the body’s primary energy source. Approximately 15% to 25% of the body is fat, the body’s energy reservoir. The remainder (muscles, bones, other body tissues and organs) is lean body mass, metabolically active tissue. Proteins in the diet primarily are used to maintain this tissue. Glycogen and proteins in this lean body mass also act as energy stores.

When dietary intake of nutrients does not meet the body’s energy needs, the body uses glycogen, body proteins, and lipids (fats) to support metabolism. In **starvation** (inadequate dietary intake), glycogen initially is used to provide energy. After the first 24 hours of starvation, gluconeogenesis (formation of glucose from proteins) is the major source of energy. As starvation continues, the body breaks down fats into free fatty acids and ketones, which provide energy for the brain. The size of all body compartments is reduced as body fats and muscle proteins are used to meet energy needs. As lean body mass is reduced, metabolically active tissue is lost, and energy expenditure decreases.

The stress of acute illness or trauma produces a different response. The acute stress response produces a state of hypermetabolism and **catabolism** (cell and tissue breakdown). This hypermetabolic state increases energy expenditure and nutrient needs. Lean body mass is broken down to meet these needs. If untreated, up to half of the body’s protein stores can be used within 3 weeks.

Many hospitalized clients are malnourished (starved) on admission. Surgery or illness promote a stress response, resulting in **protein-calorie malnutrition (PCM)**. In PCM, both protein and calories are deficient. Chronic protein deficiency with adequate calories to meet energy needs is called *kwashiorkor*. When both proteins and calories are insufficient to meet the body’s needs, PCM is known as *marasmus*.

Manifestations

The manifestations of malnutrition may vary among clients. Weight loss is the most apparent manifestation of malnutrition. The malnourished client may have a body weight of less than 90% of ideal. Body mass also is reduced (see Box 22–1), as is skinfold thickness. Other manifestations include a wasted appearance, dry and brittle hair, and pale mucous membranes. Peripheral or abdominal edema may be present. Older adults may present with general symptoms of frailty, including weakness, slow walking speed, low physical activity level, unintentional weight loss, and exhaustion (DiMaria-Ghalili & Amella, 2005). Manifestations of specific nutrient deficiencies may be present (see box on page 642). See page 643 for the *Multisystem Effects of Malnutrition*.

MEETING INDIVIDUALIZED NEEDS Nutrition for the Older Adult

Older adults are at greater risk for malnutrition. Age-related changes that contribute to this problem include changes in taste and smell, a higher incidence of gastrointestinal disease, poor oral health, loss of teeth or ill-fitting dentures, anorexia caused by medications, and functional limitations that impair the ability to shop and cook. Psychosocial issues also contribute to the problem. Older adults living on fixed incomes, many at the poverty level, may not be able to afford well-balanced meals. Loss of appetite is a problem commonly seen with depression. Social isolation and loneliness contribute to the problem. Eating is a social event, and older adults who eat alone may not eat as well as those who share meals with companions, and may consume too few, or too many, calories.

Conduct a thorough assessment to determine nutritional status. Assess psychologic factors that influence eating habits, such as loneliness, isolation, and depression. Note the client's general appearance and obtain a diet history, including information about

foods and nutrients the client consumes, and recent weight loss or gain. Review laboratory values, including complete blood count, total protein, and albumin.

TEACHING FOR HOME CARE

To maintain nutritional status, the older client should be advised to:

- Eat a well-balanced diet.
- Eat fresh fruits and vegetables.
- Shop wisely to get the most value for the money.
- Avoid processed foods.
- Avoid foods high in fat.
- Drink adequate fluids.
- Exercise regularly.
- Contact local agencies for the availability of congregate meals (e.g., at local senior centers) or home-delivered meals (e.g., Meals-on-Wheels).

Subcutaneous fat and muscle proteins are broken down in PCM, impairing mobility and increasing the risk for skin and tissue breakdown (pressure ulcers). Protein synthesis is inhibited and wound healing delayed. Serum albumin levels fall, leading to abdominal edema, diarrhea, and impaired nutrient absorption. Immune function is impaired, increasing the risk of infection. Cardiac output falls, and the risk for postural hypotension increases.

INTERDISCIPLINARY CARE

The goal of treatment for the malnourished client is to restore ideal body weight while replacing and restoring depleted nutrients and minerals. The client's age, severity of malnutrition, and coexisting health problems help determine interventions. Treatment may include oral supplementation, tube feedings, or total parenteral nutrition.

Diagnosis

A nutrition screening tool such as the one in Box 22–4 can help identify clients at risk for malnutrition. As with obesity, the standard measurements to assess for malnutrition include height, weight, calculation of BMI, and skinfold measurements. A BMI of less than 18 to 20 kg/m² may indicate malnutrition. The following laboratory studies also may be ordered:

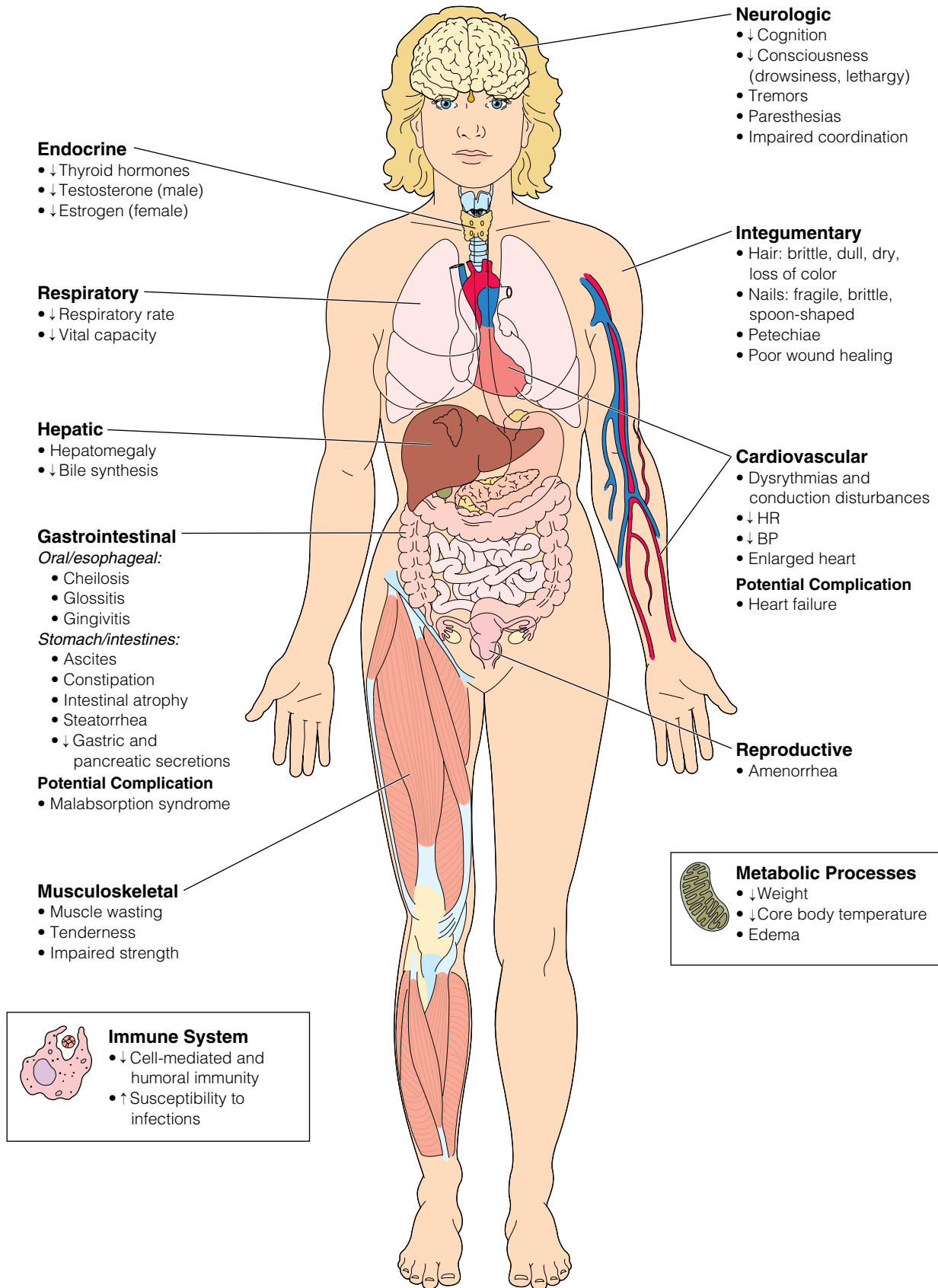
- *Serum albumin* is reduced in PCM, and may be below 3.0 g/dL.
- *Prealbumin* (also known as *transthyretin*) should be measured for any client at risk for malnutrition and anyone with a serum albumin of less than 2.8 g/dL. Prealbumin, which has a short (2-day) half-life, is a better measure of nutritional status than albumin because it is sensitive to acute changes in nutritional status and less influenced by liver disease (Kuszajewski & Clontz, 2005). See Table 22–7 for normal prealbumin levels and the implications of reduced prealbumin levels.
- The *total lymphocyte count* is evaluated by multiplying the WBC by the percentage of lymphocytes. The total lymphocyte count is reduced in PCM.

MANIFESTATIONS of Specific Nutrient Deficiencies

DEFICIENCY	ASSESSMENT DATA
Calorie	Weight loss Weakness, listlessness Loss of subcutaneous fat Muscle wasting
Protein	Thin or sparse hair Flaking skin Hepatomegaly
Vitamin A	Night blindness Altered taste and smell Dry, scaling, rough skin
Thiamine	Confusion, apathy Cardiomegaly, dyspnea Muscle cramping and wasting Paresthesias, neuropathy Ataxia
Riboflavin	Cheilosis, stomatitis Neuropathy, glossitis
Vitamin C	Swollen, bleeding gums Delayed wound healing Weakness, depression Easy bruising
Iron	Smooth tongue Listlessness, fatigue Dyspnea

- *Serum electrolytes* are measured. Potassium levels are low in severe malnutrition.
The following specialized procedures to evaluate the extent of malnutrition may be ordered:
- *Bioelectric impedance analysis* measures body fat and total body water. Differences in the conductivity of a weak current

MULTISYSTEM EFFECTS OF Malnutrition



BOX 22–4 A Nutrition Screening Tool for Clients

	Yes (points)
■ I have an illness or condition that made me change the kind and/or amount of food I eat.	2
■ I eat fewer than two meals per day.	3
■ I eat few fruits or vegetable or milk products.	2
■ I have three or more drinks of beer, liquor, or wine almost every day.	2
■ I have tooth or mouth problems that make it hard for me to eat.	2
■ I don't always have enough money to buy the food I need.	4
■ I eat alone most of the time.	1
■ I take three or more different prescribed or over-the-counter drugs a day.	1
■ Without wanting to, I have lost or gained 10 pounds in the last 6 months.	2
■ I am not always physically able to shop, cook, and/or feed myself.	2
TOTAL	
If the total score is:	
0–2 Minimal nutritional risk	
3–5 Moderate nutritional risk; recheck in 3 months	
6 or more High nutritional risk; interventions to improve nutrition are indicated	

Source: Adapted from *Determine Your Nutritional Health*, by The Nutrition Screening Initiative, a product of American Academy of Family Physicians, The American Dietetic Association, and The National Council on the Aging, Inc. Available at <http://www.aafp.org/x17367.xml>

(measured between the hands and feet) allow calculation of body fat and water (current flows more slowly through fat tissue than through water).

- *Total daily energy expenditure* (which includes resting energy expenditure, energy needed for digestion, plus physical activity needs) may be measured to help determine the client's calorie intake needs.

Medications

Malnourished clients generally require supplemental vitamins and minerals to restore these essential micronutrients. A multi-vitamin and mineral supplement may be given, or therapy may be tailored to correct specific deficiencies. See the Medication Administration box on page 645 for nursing implications of vitamin and mineral supplements.

Nutrition

Fluids and nutrients are carefully reintroduced in severely malnourished clients. First, fluid and electrolyte imbalances are corrected, with particular attention paid to restoring normal potassium, magnesium, and calcium levels, as well as acid–base balance. Once fluid and electrolyte imbalances are corrected, protein and calories are gradually reintroduced into the diet. Initial feedings are limited amounts (100 mL) of liquid formula to

prevent diarrhea. Vitamin and mineral supplements at about twice the Dietary Reference Intake (DRI) are provided along with refeeding. Fat and lactose are reintroduced into the diet last. Lactose intolerance may develop in severely malnourished clients; yogurt may be tolerated better than a milk-based formula.

Gradual refeeding is necessary to prevent electrolyte imbalances from developing as potassium, magnesium, phosphorus, and glucose move into the cells. Heart failure may occur due to depressed cardiac function. Abnormalities in gastrointestinal function can lead to malabsorption and diarrhea with refeeding (Tierney et al., 2005). Food intake is gradually increased until the client is able to consume about 5000 kcal per day, and is gaining 3 to 5 pounds (1.5 to 2.0 kg) weekly. Commercially available nutritional supplements (such as Carnation Instant Breakfast, Ensure, and Sustacal) may supplement protein and calorie intake. Administering 2 ounces of nutritional supplement with each medication given (unless the medication must be given on an empty stomach) may be an effective way to increase clients' calorie and protein intake (Bender et al., 2000).

ENTERAL NUTRITION Enteral nutrition, or tube feeding, may be used to meet calorie and protein requirements in clients unable to consume adequate food. Indications for tube feedings include difficulty swallowing, unresponsiveness, oral or neck

TABLE 22–7 Normal and High Risk Prealbumin Levels

PREALBUMIN LEVEL	IMPLICATIONS	SUGGESTED INTERVENTIONS
15–35 mg/dL	Within normal limits	None
11–14.9 mg/dL	High risk for nutritional deficit	Monitor level biweekly
5–10.9 mg/dL	Significant risk for malnutrition	Aggressive nutritional support (e.g., enteral feedings or total parenteral nutrition)
≤5mg/dL	Malnourished	

MEDICATION ADMINISTRATION Vitamin and Mineral Supplements

FAT-SOLUBLE VITAMINS

Vitamin A
Vitamin D
Vitamin E
Vitamin K

The fat-soluble vitamins are absorbed in the gastrointestinal tract. Vitamins A and D are stored in the liver.

All fat-soluble vitamins may become toxic if taken in excess amounts.

Nursing Responsibilities

- Monitor for manifestations of vitamin excess as well as for adverse effects from vitamin administration.
- Monitor carefully for hypersensitivity reactions during the parenteral administration. Have emergency equipment available.
- Administer vitamin A with food.
- Do not administer vitamin K intravenously.

Health Education for the Client and Family

- Teach the importance of eating a well-balanced diet. If indicated, provide lists of foods high in specific vitamins.
- Caution that excessive intake of these vitamins may lead to vitamin toxicity.

WATER-SOLUBLE VITAMINS

Vitamin C (ascorbic acid)

Vitamin B complex:

Thiamine (B₁)

Riboflavin (B₂)

Niacin (nicotinic acid)

Pyridoxine hydrochloride (B₆)

Pantothenic acid

Biotin

These vitamins are used to prevent or treat deficiency problems. If the diet is deficient in one vitamin, it is usually deficient in other vitamins as well; therefore, multivitamin preparations are often

administered. Most of these vitamins are well absorbed from the gastrointestinal tract.

Nursing Responsibilities

- Monitor for responses to replacement therapy.
- Monitor for hypersensitivity reactions from parenteral administration. Have emergency equipment available.

Health Education for the Client and Family

- Do not exceed the recommended daily allowances for the specific vitamin.

MINERALS

Sodium

Potassium

Magnesium

Calcium

Copper

Fluoride

Iodine

Zinc

Manganese

Chromium

Selenium

Minerals are inorganic chemicals that are vital to a variety of physiologic functions. Also called trace elements, these minerals are part of a balanced diet. Recommended daily intakes have not been established for all mineral substances. The dosage of prescribed minerals depends on the specific deficiency, route of administration, and the client's general health.

Nursing Responsibilities

- Monitor for manifestations of mineral imbalance.
- Prior to administration, dilute oral mineral preparations.
- Prior to the administration, of iodine, assess for history of hypersensitivity to iodine or seafood; if hypersensitive notify the physician.

Health Education for the Client and Family

- Encourage the client to avoid exceeding the known recommended daily intake of the mineral.
- Instruct the client to take minerals other than fluoride and zinc with or after meals.

surgery or trauma, anorexia, or serious illness. Tube feedings may provide part or all of a client's nutritional needs. Recent evidence supports using the enteral route for nutritional support whenever possible. Enteral feedings provide nutrients directly to the gut and other digestive organs, reduce the incidence of enteric pathogens, promote blood flow to the gut, and support other functions of the GI tract such as the release of hormones and epidermal growth factor (Kasper et al., 2005).

Tube feedings are usually administered through a soft, small-caliber nasogastric or nasoduodenal tube with a weighted mercury tip (Figure 22–2 ■). They also can be administered through a gastrostomy or jejunostomy tube. Small-bore feeding tubes are easily displaced; appropriate tube placement should be periodically checked by aspirating the tube and checking the pH of aspirated contents. A pH of < 4 indicates placement in the stomach; pH > 6 indicates the tube is in the jejunum. See Box 22–5 and the Nursing Research box on page 647.

Most tube feeding formulas provide 1 kcal/mL with approximately 14% of the calories from protein, 60% from carbohydrates, and 25% to 30% from fat. Administering 1500 mL per day provides the recommended daily intake of all vitamins

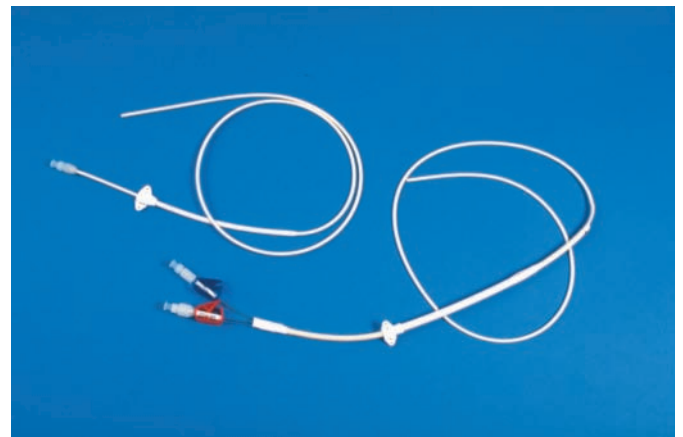


Figure 22–2 ■ A nasoduodenal tube and a jejunostomy tube.

Courtesy of Michal Heron/Pearson Education/PH College

and minerals. Formulas that provide more calories per milliliter, more grams of protein, added fiber, or lower fat also are available (Table 22–8). Commercial products provide instructions for initiating therapy. Enteral feedings may initially be

BOX 22–5 Measures to Verify Feeding Tube Placement

After inserting the feeding tube and verifying appropriate placement through pH of the aspirate and an x-ray, mark the feeding tube position with indelible marker. Prior to each feeding (or every 8 to 12 hours if continuous feedings are being administered), assess the abdomen and tube placement. Use the following steps to assess tube placement:

- Assess the abdomen for distention, bowel sounds, and tenderness using the sequence of inspection, auscultation, percussion, and palpation.
- Assess tube condition and placement by verifying that the indelible mark remains at the same position. Ask the client to open the mouth, and inspect the position of the tube in the oropharynx. Do not administer a feeding if the client is having difficulty speaking or is coughing.
- Using a 60-mL syringe, inject 30 mL of air into the feeding tube, then aspirate a small amount of stomach contents and check the pH of the aspirate.

Reassess tube placement if the client vomits or retches, requires oropharyngeal suctioning, complains of discomfort or reflux into the mouth, or develops signs of respiratory distress (Best, 2005).



Figure 22–3 ■ The nurse secures the feeding tube of a client receiving a continuous enteral feeding.

Courtesy of Michal Heron/Pearson Education/PH College

started with smaller volumes to prevent diarrhea, with the volume gradually increased to provide the required calories for maintenance and healing. Formulas may be administered as a bolus feeding or as a continuous-drip feeding regulated by a feeding pump (Figure 22–3 ■).

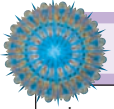
Aspiration and diarrhea are the most common complications of enteral feedings. Continuous infusion of the formula reduces the risk of aspiration. The risk also is reduced by placing the feeding tube in the jejunum rather than the stom-

ach. To avoid aspiration, the nurse elevates the head of the bed at least 30 degrees during feeding and for at least 1 hour after feeding. Dual-lumen tubes that allow gastric suction with simultaneous instillation of an enteral feeding into the jejunum also reduce the risk for aspiration. Formulas that contain fiber can reduce the incidence of diarrhea. Fluid and electrolyte status is monitored carefully, and additional water is administered as needed.

PARENTERAL NUTRITION Total parenteral nutrition (TPN), also known as *hyperalimentation*, is the intravenous administration of carbohydrates (high concentrations of dextrose), protein (amino acids), electrolytes, vitamins, minerals, and fat emulsions. These hypertonic solutions usually are administered through a central vein, such as the subclavian vein (Figure 22–4 ■). A peripherally inserted central catheter

TABLE 22–8 Selected Enteral Feeding Formulas

FORMULA TYPE	CONTAINS	EXAMPLES
Complete —suitable for most clients requiring enteral feedings	<ul style="list-style-type: none"> ■ 1 kcal/mL ■ Protein: ~ 14% total kcal ■ Fat: ~ 30% total kcal ■ Carbohydrate: ~ 60% total kcal ■ Recommended daily intake of all minerals and vitamins is 1500 mL/day 	Compleat, Ensure, Isocal, Nutren, Isolan, Sustacal, Resource
High-calorie complete —appropriate for clients on fluid restriction	As above; provides 1.5 to 2 kcal/mL	Ensure Plus, Sustacal HC, Comply, Nutren 1.5, Resource Plus, Isocal HCN, Magnacal, TwoCal HN
Complete lactose-free, high-residue —used to prevent/treat diarrhea, constipation	As above; provides fiber	Jevity, Profiber, Nutren 1.0 with fiber, Fiberlan, Sustacal with fiber, Ultracal, Ensure with fiber, Fibersource, Accupeg HPF, Reabfin, others
Disease-specific formulas:		
Renal failure	Contain essential amino acids	Amin-Aid, Travasorb Renal, Aminess
Respiratory failure	Fat: > 50% total kcal	Pulmocare, NutriVent
Liver failure with hepatic encephalopathy	High amounts of branched-chain amino acids	Hepatic-Acid II, Travasorb Hepatic



NURSING RESEARCH Evidence-Based Practice: Determining Feeding Tube Placement

The auscultatory method of determining the location for feeding tubes on initial placement and prior to initiating feeding is commonly recommended in nursing textbooks and is frequently used. The premise is that injecting a small amount of air into the tube will produce a distinctive sound if the tube is correctly located, presumably in the stomach. Sounds produced by tubes located in the esophagus, intestines, and respiratory tract are presumed to be different enough to alert the nurse to the improper location. However, based on a series of studies (Metheny et al., 1998), the auscultatory method for determining placement is not reliable. This is especially true for small-bore feeding tubes. Testing the pH level of aspirates from newly inserted feeding tubes and of tubes from clients receiving intermittent feedings can help distinguish gastric from respiratory and intestinal placement. Based on the pH of a large number of samples of aspirates from feeding tubes, a pH between 0 and 4 suggests gastric placement and a pH of 7 or greater indicates respiratory placement. As the tube advances through the stomach into the intestine, pH levels increase and the color of the aspirate changes. If placement in the small intestine is required, a confirmatory x-ray should be taken. These researchers recommend that the pH method be used rather than the auscultatory method and that protocols be updated to reflect current information.

IMPLICATIONS FOR NURSING

With the advent of small-bore nasogastric and nasointestinal feeding tubes and the increasing use of gastrostomy and jejunostomy feeding tubes, more and more clients are receiving enteral feedings. Nurses need to use alternative methods to auscultation to determine correct initial and continued placement of these tubes. Aspiration of contents and pH testing is more effective for determining tube placement.

CRITICAL THINKING IN CLIENT CARE

1. This study investigated differences in auscultatory sounds through small-lumen feeding tubes. Would the sound be more noticeably different with the larger bore tubes used for gastric lavage and drainage?
2. What other methods for determining tube placement are recommended in fundamentals and skills texts?
3. Compare the normal pH of aspirates obtained from the respiratory tract, esophagus, stomach, duodenum, and jejunum.
4. Develop a teaching plan for the client being discharged with a gastrostomy or jejunostomy feeding tube.

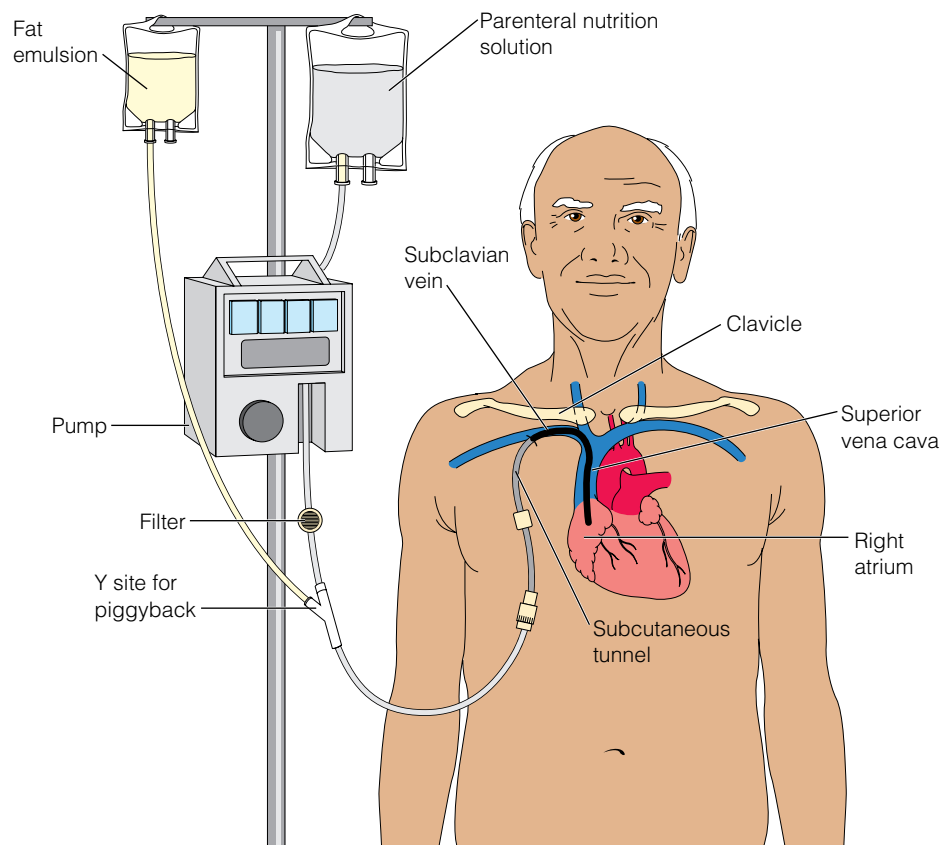


Figure 22-4 ■ Total parenteral nutrition through a catheter in the right subclavian vein.

(PICC) line may be used for short-term TPN. *Partial parenteral nutrition* (used to support the client who is able to consume some nutrients or in conjunction with enteral feeding) may be given through a peripheral vein.

TPN is initiated when a client's nutritional requirements cannot be met through diet, enteral feedings, or peripheral vein infusions. Clients who have undergone major surgery or trauma or are seriously undernourished are often candidates for TPN. TPN is used for both short- and long-term management of nutritional deficiencies, and many clients are discharged to home with TPN and monitored by home health nurses.

To begin therapy, the physician inserts the central venous catheter under aseptic conditions. The location of the catheter tip is confirmed by x-ray. A triple-lumen catheter is most commonly used. This type of catheter permits administration of medications, intralipids, or blood through other lumens. Parenteral nutrition solutions are mixed in the pharmacy using sterile technique under a laminar-flow-air hood. A commonly used solution includes 500 mL of 50% dextrose, 500 mL of an 8.5% amino acid solution, electrolytes, minerals, and vitamins. The sterility of the solution is maintained, and no medication, other than intralipids, is added to the solution after it is mixed or to the lumen through which the TPN is being administered. Most hospitals have specific policies and procedures for changing the tubing and the dressing at the insertion site as well as for hanging new containers. TPN solutions are always administered with an infusion pump to ensure the correct rate of infusion.

The client receiving parenteral nutrition is at risk for mechanical, metabolic, and infectious complications. Pneumothorax, hemothorax, brachial plexus injury, and improper position are possible complications of central venous catheter insertion. Once in place, the catheter may dislodge, leak, or break and become an embolus. Clots also may form within or around the catheter.

Fluid overload is a risk with parenteral nutrition, particularly in older adults. The high-glucose formulas can lead to osmotic diuresis or shifts of electrolytes, potassium and phosphorus in particular, into the cells, leading to hyperglycemia, hypokalemia, or hypophosphatemia. Blood glucose and serum electrolyte levels are carefully monitored during treatment. In addition to electrolyte imbalances, acid-base disturbances may develop, as well as refeeding edema or heart failure (Kasper et al., 2005). Long-term use of parenteral nutrition can lead to gallstone formation and liver disease. Nutrient deficiencies may develop, including deficiencies of vitamins, iron, and other minerals when parenteral nutrition is continued for three or more months (Kasper et al., 2005).

Disruption of the skin barrier and administration of a solution high in glucose presents a risk for infection in clients receiving TPN. Infection may be local, limited to the exit site or surrounding a tunneled catheter, or may lead to sepsis. The temperature and other manifestations of infection are carefully monitored. Meticulous sterile technique is used for site and catheter care and bag and tubing changes.



NURSING CARE

Health Promotion

Aggressive nursing assessment and interventions can help prevent malnutrition associated with hospitalization or long-term care. In hospitalized clients, carefully monitor food intake. When the client is placed on NPO status for surgery or tests, ask the care provider to restore diet orders as soon as possible. If allowed, encourage family members to provide favorite foods to promote intake. In long-term care settings, promote socialization during meals. Assess food likes and dislikes for clients, and provide foods they are likely to eat.

Assessment

Collect nutritional assessment data on admission and periodically (once or twice a week) during long-term institutionalization.

- **Health history:** Usual daily dietary pattern (type and amount of foods consumed); usual weight and recent changes; appetite and food tolerance; specific food likes and dislikes; difficulty swallowing; problems such as anorexia, nausea, diarrhea, or constipation; history of surgery and/or chronic diseases (e.g., chronic lung disease) and medications.
- **Physical examination:** Height, weight, skinfold thickness, BMI; vital signs; general appearance, muscle wasting, mobility; skin and mucous membranes; bowel sounds; laboratory studies.

Use of a nutritional assessment tool can help identify clients (older adults in particular) at risk for malnutrition (see Box 22-4). This tool assesses food intake, mobility, and BMI, as well as weight loss, psychologic or physiologic stress, and dementia or psychologic conditions to determine the presence of or risk for malnutrition (DiMaria-Ghalili & Amella, 2005).

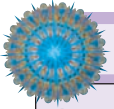
Nursing Diagnoses and Interventions

The complex effects of malnutrition on multiple body systems place the client at high risk for a number of other problems. This section addresses problems with nutrition, infections, fluid volume, and skin integrity. See page 649 for a Nursing Care Plan for the client with malnutrition.

Imbalanced Nutrition: Less than Body Requirements

The nurse plays a critical role in the ongoing assessment of the malnourished client, while collaborating with the multidisciplinary team to provide nutritional therapies.

- If the client is able to eat, provide an environment and nursing measures that encourage eating. Eliminate foul odors, provide oral hygiene before and after meals, make meals appetizing, and offer frequent, small meals including preferred foods. Consult with the nutrition support team to provide adequate protein, calories, minerals, and vitamins. *Oral hygiene and a pleasant environment make food more appetizing. Small, frequent meals are generally more appealing and less overwhelming to a client with anorexia. Many clients require complicated nutritional therapy such as enteral or parenteral therapy to meet nutritional needs.*



NURSING CARE PLAN A Client with Malnutrition

Rose Chow is an 88-year-old widow who lives alone. She typically rises early and has a cup of tea before spending her morning putting in her garden. She consumes her main meal of the day at lunch, which usually includes rice and some vegetables. For dinner, she generally eats a bowl of rice with “whatever seems to be in the refrigerator.” She admits to little interest in cooking or eating since her husband died 10 years ago and her group of friends has been “dying off too.”

ASSESSMENT

Mrs. Chow weighs 95 lb (43.1 kg) and is 5'3" (160 cm) tall, for a BMI of 16.8. She reports weighing 118 lb (53.5 kg) 5 years ago. Her triceps skinfold thickness measurement is 11 mm (normal values for a female: >13 mm). Her skin is pale, and she appears thin and wasted. Her temperature is 97°F (36.1°C). Diagnostic test results include serum albumin 2.9 g/dL (normal 3.4 to 4.8 g/dL) and serum cholesterol 130 mg/dL (normal 150 to 200 mg/dL). A diagnosis of protein-calorie malnutrition is made, and a 1500-calorie per day diet is recommended.

DIAGNOSES

- *Imbalanced Nutrition: Less than Body Requirements* related to lack of knowledge and inadequate food intake
- *Risk for Infection* related to protein-calorie malnutrition
- *Impaired Social Interaction* related to widowhood and reduced social support group

EXPECTED OUTCOMES

- Gain at least 1 pound per week.
- Verbalize understanding of nutritional requirements and identify strategies to incorporate requirements into daily diet after discharge.
- Remain infection free, evidenced by normal vital signs.

- Identify strategies to increase social interaction, such as participating in senior citizens' lunches at local senior center.

PLANNING AND IMPLEMENTATION

- Weigh weekly at a consistent time of day.
- Refer to dietitian for evaluation of nutritional needs.
- Teach about nutritional requirements, and plan an eating program that includes high-calorie, high-protein foods and supplements and reflects her food preferences. Encourage small, frequent meals.
- Encourage to keep a food intake diary.
- Teach strategies to reduce risks for infection.
- Provide information about communal meals available to seniors in the community, and help Mrs. Chow develop a plan to participate.

EVALUATION

One month later, Mrs. Chow has gained 3 pounds and reports feeling “more energetic.” A friend is helping her shop to ensure that she purchases foods to maintain her protein, calorie, and nutrient intake. She has begun attending senior lunches twice a week, and is enjoying “being around people again.” Although she still doesn't enjoy cooking like she used to, she is using prepared foods and supplements to maintain her nutrient intake.

CRITICAL THINKING IN THE NURSING PROCESS

1. What is the physiologic basis for Mrs. Chow's low albumin and cholesterol levels?
2. Mrs. Chow asks, “Can I get better by just taking more vitamins?” How will you respond?
3. Design a teaching plan for a Hispanic client with protein-calorie malnutrition.

See Evaluating Your Response in Appendix C.

- Provide a rest period before and after meals. *Eating requires energy, and the malnourished client may have decreased physical strength and energy.*
- Assess knowledge and provide appropriate teaching. *Lack of knowledge often contributes to undernutrition. Education empowers the client to make healthy choices.*

Risk for Infection

Malnourished clients have a much higher risk for infection than well-nourished people. Malnutrition affects many components of the immune system, including the skin, mucous membranes, and lymph tissue and cells.

- Monitor temperature and assess for manifestations of infection every 4 hours. *Although the baseline temperature may be subnormal in malnourished clients, any elevation from baseline may indicate infection. Manifestations of infection may include chills, malaise, erythema, and leukocytosis. Early detection of infection may prevent complications.*
- Maintain medical asepsis when providing care and surgical asepsis when carrying out procedures. *Hand washing is the best strategy to prevent the spread of pathogens. Sterile tech-*

nique is required for procedures such as inserting central lines and changing dressings.

- Teach the signs and symptoms of infection, good hand washing technique, and factors that increase the risk for infection. *Knowledge empowers the client to participate in self-care, thus reducing exposure to infectious pathogens.*

Risk for Deficient Fluid Volume

The client with malnutrition may also have a fluid volume deficit. Difficulty swallowing food and fluids or administration of hyperosmolar nutritional solutions may lead to dehydration or electrolyte disturbances.

- Monitor oral mucous membranes, urine specific gravity, level of consciousness, and laboratory findings every 4 to 8 hours. *Dry mucous membranes, increased urine specific gravity, decreased level of consciousness, and electrolyte imbalances may indicate dehydration.*
- Weigh daily and monitor intake and output. *Daily weights and intake and output measurements help monitor fluid balance.*
- If allowed, offer fluids frequently in small amounts, considering the client's preferences. *Frequent, small amounts of fluids are better tolerated and promote adequate intake.*

Risk for Impaired Skin Integrity

Skin integrity depends on adequate nutrition. Loss of subcutaneous tissue and muscle increase the risk of pressure ulcers. In addition, healing is impaired in malnourished clients.

- Assess skin every 4 hours. *Baseline and ongoing assessments allow prompt identification of early manifestations of skin breakdown.*
- Turn and position at least every 2 hours. Encourage passive and active range-of-motion exercises. *These measures reduce pressure and promote oxygenation of cells.*
- Keep skin dry and clean, and minimize shearing forces. Keep linens smooth, clean, and dry. Provide therapeutic beds, mattresses, or pads. *These nursing measures promote comfort and reduce the risk of skin breakdown.*

Using NANDA, NIC, and NOC

Chart 22–2 shows links between NANDA nursing diagnoses, NIC, and NOC for the client with malnutrition.

Community-Based Care

Clients with malnutrition may be cared for at home or in the hospital with diet, enteral, or parenteral therapy. Each year, it is more common to see clients managing tube feeding or TPN at home. Teaching for the client and family includes the following topics:

- Diet recommendations and use of nutritional supplements
- Where to obtain recommended foods and nutritional supplements

- If continuing enteral or parenteral nutrition, how to (1) prepare and/or handle solutions, (2) add them to either the feeding tube or central line, (3) manage infusion pumps, (4) care for the feeding tube or central catheter, (5) recognize and manage problems and complications, and (6) how and when to notify the healthcare provider of problems.

THE CLIENT WITH AN EATING DISORDER

Eating disorders are characterized by severely disturbed eating behavior and weight management. Eating disorders are more common in affluent societies where food is plentiful. Women are much more commonly affected than men. **Anorexia nervosa** is characterized by a body weight less than 85% of expected for age and height and an intense fear of gaining weight or of loss of control over food intake. Anorexia nervosa affects about 0.5% to 3.7% of women in the United States at some time in their lives (NIH, 2001). **Bulimia nervosa**, which affects 1% to 4% of women in the United States, is characterized by recurring episodes of binge eating followed by purge behaviors such as self-induced vomiting, use of laxatives or diuretics, fasting, or excessive exercise. A third eating disorder, **binge-eating disorder**, is believed to affect many more people than either anorexia or bulimia. Binge-eating disorder is characterized by recurrent episodes of binge eating—eating an excessive amount of food during a defined period of time and a sense of lack of control over eating during binge episodes (NIH, 2001).

Anorexia Nervosa

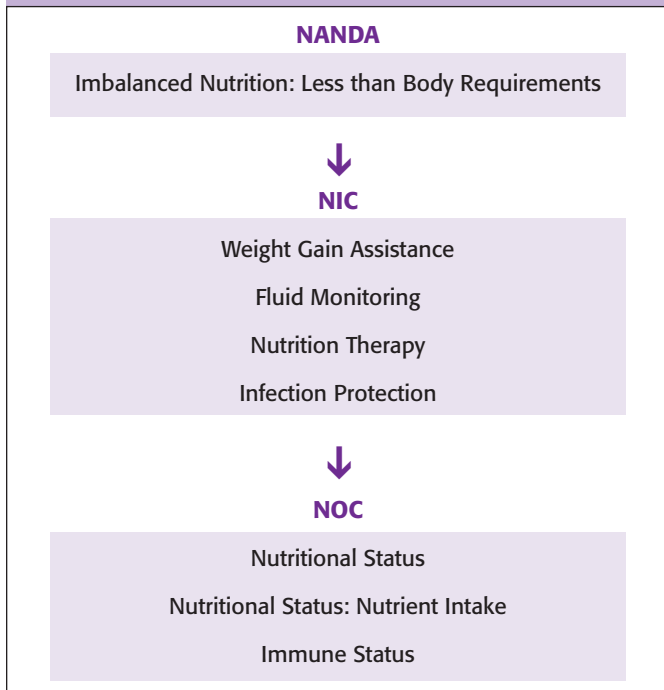
Anorexia nervosa typically begins during adolescence. Clients with anorexia nervosa have a distorted body image and irrational fear of gaining weight. Refusal to maintain body weight at or above a minimally normal level for height and body type is a common manifestation of anorexia nervosa. Clients maintain weight loss by restricted calorie intake, often accompanied by excessive exercise. Some may exhibit binge–purge behavior. Although its cause is unknown, a number of risk factors, both biologic and psychosocial, have been identified for anorexia nervosa. Abnormal levels of neurotransmitters and other hormones may play a role. Current research suggests genetic factors in the development of eating disorders as well (National Eating Disorders Association, 2004). Women who develop anorexia nervosa tend to be obsessive and perfectionistic, and often feel inadequate or unable to maintain control in their lives. Family, social, or occupational (e.g., a career in modeling or ballet) pressures to maintain low body weight also contribute. Clients with anorexia often experience depression or anxiety.

The manifestations and complications of anorexia nervosa are listed in the box on page 651. Clients who engage in binge–purge behavior have a higher risk for complications.

Bulimia Nervosa

Bulimia nervosa develops in late adolescence or early adulthood, often following failed attempts to lose weight through dieting. Some studies suggest that bulimia may affect as many as

NANDA, NIC, AND NOC LINKAGES CHART 22–2 The Client with Malnutrition



Data from *NANDA's Nursing Diagnoses: Definitions & Classification 2005–2006* by NANDA International (2005), Philadelphia; *Nursing Interventions Classification (NIC)* (4th ed.) by J. M. Dochterman & G. M. Bulechek (2004), St. Louis, MO: Mosby; and *Nursing Outcomes Classification (NOC)* (3rd ed.) by S. Moorhead, M. Johnson, and M. Maas (2004), St. Louis, MO: Mosby.


MANIFESTATIONS AND COMPLICATIONS of Eating Disorders

Disorder	Manifestations	Complications
Anorexia Nervosa	<ul style="list-style-type: none"> ■ Weight < 85% of normal, muscle wasting ■ Fear of weight gain, refusal to eat ■ Disturbed body image, excessive exercise ■ Amenorrhea ■ Skin and hair changes ■ Hypotension, bradycardia ■ Hypothermia ■ Constipation ■ Insomnia 	<ul style="list-style-type: none"> ■ Electrolyte and acid–base disturbances ■ Reduced cardiac muscle mass, low cardiac output, dysrhythmias ■ Anemia ■ Hypoglycemia, elevated serum uric acid levels ■ Osteoporosis ■ Enlarged salivary glands ■ Delayed gastric emptying ■ Abnormal liver function
Bulimia Nervosa	<ul style="list-style-type: none"> ■ Weight often normal; may be slightly overweight ■ Binge–purge behavior ■ Oligomenorrhea or amenorrhea ■ Lacerations of palate; callous on fingers or dorsum of hand 	<ul style="list-style-type: none"> ■ Enlarged salivary glands ■ Stomatitis, loss of dental enamel ■ Fluid, electrolyte, and acid–base imbalances ■ Dysrhythmias ■ Esophageal tears, stomach rupture
Binge-Eating Disorder	<ul style="list-style-type: none"> ■ Usually overweight or obese ■ Recurrent episodes of binge eating (2 or more days a week for 6 months) ■ Episodes characterized by: <ul style="list-style-type: none"> ■ Eating more rapidly than usual ■ Eating until uncomfortably full ■ Eating large amounts of food when not physically hungry ■ Eating alone due to embarrassment over quantity ■ Disgust, depression, or guilt following a binge episode ■ Marked distress about bingeing behavior 	<ul style="list-style-type: none"> ■ Type 2 diabetes ■ Hypertension, hyperlipidemia ■ Coronary heart disease, heart failure ■ Gallbladder disease ■ Depression, social isolation

19% of college-age women (Tierney et al., 2005). The client with bulimia typically reports binge eating followed by purging 5 to 10 times per week (Kasper et al., 2005). Foods consumed during a binge often are high calorie, high fat, and sweet. After binge eating, the client induces vomiting (usually by stimulating the gag reflex), or may take excessive quantities of laxatives or diuretics. In contrast to anorexia, the client's weight often is normal. Fluid and electrolyte balance, in contrast, may be severely disrupted by loss of fluid and gastrointestinal secretions. The complications of bulimia nervosa (see the box above) primarily result from the purging behavior.

Binge-Eating Disorder

Binge-eating disorder (BED) was identified as a distinct condition in 1992 (Eating Disorders Association, 2004). While many of the characteristics of bulimia and binge-eating disorder are similar, clients with BED do not purge. BED commonly affects middle-aged adults and is slightly more common in women than in men. It affects blacks and whites equally. People with BED usually are overweight or obese, often morbidly obese (NIH, 2004). The cause of BED is unknown, although genetics may play a role in its development. Psychosocial factors contribute; up to half of people with BED either are depressed or have experienced depression in the past. Alcohol abuse and impulsivity are common behavioral traits in clients with BED (NIH, 2004).

People with BED consume an excessive amount of food during bingeing episodes, eating even when not hungry and continuing to eat until uncomfortably full. Bingeing often occurs when the person is alone. After overeating, the client may feel disgusted or guilty about the amount of food consumed, and depressed about the inability to control eating.

INTERDISCIPLINARY CARE



Eating disorders, anorexia nervosa in particular, are difficult to effectively treat. Because of the intense fear of weight gain and the distorted body image of clients with anorexia, they strongly resist increasing food intake. While community-based care is appropriate for most clients with an eating disorder, complications of the disorder or resistance to treatment may necessitate hospitalization for some clients. In all cases, a comprehensive treatment plan for eating disorders includes medical care and monitoring, psychosocial interventions, and nutrition counseling (NIH, 2001).

Diagnosis

There is no specific diagnostic test for anorexia, bulimia, or binge-eating disorder. Laboratory studies in clients with anorexia or bulimia may show anemia and leukopenia on CBC, abnormal serum electrolyte levels, and elevated BUN and serum creatinine. In clients with BED, the blood glucose and

lipid levels may be elevated. The BMI usually is above the normal range, and may identify the client as obese or morbidly obese.

A mental health evaluation is indicated for clients with eating disorders to identify contributing factors and help direct treatment.

Treatment

Clients with anorexia nervosa may require hospitalization, particularly if their weight is less than 75% of normal. Refeeding is gradually introduced to avoid complications such as heart failure. Meals must be supervised and a firm but empathetic attitude conveyed about the importance of adequate food intake. Intravenous feeding may be required in some cases. Psychologic treatment, initiated when malnutrition has been corrected and weight gain begun, focuses on providing emotional support during weight gain and helping clients base their self-esteem on factors other than weight (e.g., personal relationships, satisfaction with achieving occupational goals) (Kasper et al., 2005). Cognitive-behavioral or psychotherapy may be used; families may be included in the treatment program. A selective serotonin reuptake inhibitor (SSRI) such as fluoxetine (Prozac) or sertraline (Zoloft) may be prescribed to facilitate weight maintenance and reduce anxiety.

The goal of bulimia treatment is to reduce or eliminate binge eating and purging behavior. A combination of nutritional counseling and therapy, psychosocial interventions, and medications may be used. Nutritional counseling is directed at establishing a regular meal pattern and encouraging an appropriate amount of regular exercise. An antidepressant drug such as fluoxetine (Prozac) may benefit the client with bulimia nervosa and help prevent relapse. Cognitive-behavioral therapy also is used to treat bulimia, focusing on excessive concerns about weight, persistent dieting, and binge-purge behaviors.

Treatment for clients with binge-eating disorder focuses on establishing healthy eating patterns, psychosocial therapy (including cognitive-behavioral therapy and group counseling) to address underlying issues, and management of obesity and its complications. Clients with BED also may benefit from an SSRI or other antidepressant drug.

It is particularly important to identify these disorders early to prevent adverse effects on growth and increase the success of treatment.

The nurse is an integral part of the eating disorders treatment team. *Imbalanced Nutrition: Less than Body Requirements* is a primary nursing diagnosis for clients with anorexia or bulimia, and *Imbalanced Nutrition: More than Body Requirements* is a priority nursing diagnosis for clients with binge-eating disorder. The following nursing diagnoses also should be considered:

- *Ineffective Sexuality Patterns*
- *Chronic Low Self-Esteem*
- *Disturbed Body Image*
- *Ineffective Therapeutic Regimen Management: Family*
- *Powerlessness.*

When planning and implementing care, consider the following nursing activities.

- Regularly monitor weight, using standard conditions. *Weight gain or loss provides information about the effectiveness of care, as well as the client's risk for complications.*
- Monitor food intake during meals, recording percentage of meal and snack consumed. Maintain close observation for at least 1 hour following meals; do not allow client alone in bathroom. *Observing the client during and after meals helps prevent disposal of food and purging behavior after eating. Recording actual food intake allows accurate calculation of calorie intake.*
- Serve balanced meals, including all nutrient groups. Increase serving size gradually. *The client may find "normal" food servings overwhelming, reducing the desire to eat. Calorie intake is initially limited to prevent complications associated with refeeding, then gradually increased.*
- Serve frequent, small feedings of cold or room temperature foods. *Cool foods reduce sensations of early satiety, promoting greater food intake at a meal or snack.*
- Administer a multivitamin and mineral supplement to replace losses.

Clients with eating disorders require extended treatment of the disorder. Involvement of the family and social support persons is vital to success. Encourage family members to participate in teaching and nutritional counseling sessions. Discuss the value of family therapy to address issues that have contributed to the disorder. Emphasize the need to provide consistent messages of support for healthy eating habits. Discuss using rewards for food and calorie intake rather than weight gain. Provide referrals to a dietitian, nutritional support team, counseling, and support groups for people with eating disorders.



NURSING CARE

Nurses can be instrumental in identifying clients with eating disorders and referring them for treatment. It is particu-

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CHAPTER HIGHLIGHTS

- Nutritional disorders are common, affecting people worldwide, and contributing significantly to mortality and morbidity. While malnutrition is a serious problem in underdeveloped nations, obesity and its consequences are more prevalent in the United States and other industrialized societies.
- Obesity, defined as excess adipose tissue and a BMI greater than 30 kg/m², is linked with many disorders, including type 2 diabetes, coronary heart disease, gallbladder disease, and osteoarthritis.
- Exercise and reduced kilocalorie intake are the mainstays of obesity treatment. Drugs that suppress the appetite or interfere with fat absorption in the gut may be used to facilitate weight loss in clients with multiple risk factors for obesity complications or people who have had difficulty achieving weight loss through diet and exercise.
- Bariatric surgery is a treatment option for morbidly obese clients. The primary types of bariatric surgery used in the United States are restrictive procedures that limit stomach capacity and food consumption, and combination restrictive/malabsorptive procedures that limit both capacity and nutrient absorption.
- Nursing care for obese clients focuses on health promotion, education, and support of the prescribed treatment plan.
- In the United States, protein-calorie malnutrition is a common problem among hospitalized clients. Malnutrition increases the risk for complications and impairs healing. Early identification and prevention are the primary focuses of treatment; nurses can be instrumental in identifying at-risk clients (e.g., the elderly, clients living alone, people on extended NPO status).
- Refeeding of malnourished clients is a gradual process. Enteral feedings (oral or by feeding tube) are preferred whenever possible. Total parenteral nutrition may be required when enteral feeding is not possible or not tolerated by the client.
- Eating disorders, including anorexia nervosa, bulimia nervosa, and binge-eating disorder, can be difficult to effectively treat and maintain in remission. While clients with anorexia typically are underweight and malnourished, resisting efforts to achieve a normal weight, clients with bulimia are more likely to be of normal weight and those with binge-eating disorder to be overweight or obese.
- Treatment for eating disorders is multifaceted, including physical care to restore electrolyte balance and treat complications, nutritional counseling and therapy, psychosocial therapy, family support, and possibly medications.

TEST YOURSELF NCLEX-RN® REVIEW

- 1 Of the following noted in a client's history, which does the nurse identify as the greatest risk factor for obesity?
 1. adopted at 2 months of age
 2. usual diet includes "fast-food" lunches twice a week
 3. does not engage in regular activity
 4. allergic to chocolate and strawberries
- 2 A client on a reduced-calorie diet asks the nurse what she can do to lose weight faster, because most weeks she loses no more than 0.5 lb. "At this rate, it will take me years to get to my goal!" The most appropriate response by the nurse would be:
 1. "Let's reevaluate your long-term goal. Perhaps it was set too low for you."
 2. "A pound of body fat equals 3500 calories. Let's reevaluate your diet and exercise plan for calorie intake and expenditure."
 3. "Perhaps we should look into a diet supplement since you are unable to stick with your prescribed diet plan."
 4. "You sound frustrated. Would you like to take some time off from your diet and exercise plan?"
- 3 An expected finding in a client admitted with a diagnosis of protein-calorie malnutrition would be:
 1. recent 5-lb weight loss.
 2. increased skinfold thickness measurements.
 3. hyperactive bowel sounds.
 4. anxiety and agitation.

- 4 Before administering an intermittent enteral feeding, the nurse confirms placement of the small-bore feeding tube in the stomach by:
- instilling water and listening for the gastric gurgle.
 - withdrawing the tube slightly, then reinserting it.
 - aspirating gastric contents and checking for a pH of <4.
 - obtaining a flat-plate x-ray of the stomach.
- 5 The nurse identifies which of the following as a realistic goal for a client with anorexia nervosa?
- Will consume 100% of a 2500-calorie diet.
 - Will gain 2 pounds per week.
 - Will rest alone in room following meals.
 - Will participate in family counseling.
- 6 The nurse identifies which nursing diagnosis as high priority for a client with a BMI of 30.4 kg/m² and a waist-hip ratio of 1.1?
- Health-Seeking Behaviors: Weight Loss*
 - Risk for Impaired Tissue Perfusion: Cardiovascular*
 - Ineffective Coping*
 - Deficient Knowledge: Diet*
- 7 The nurse teaching a client about sibutramine (Meridia) includes which of the following instructions? (Select all that apply.)
- You may skip a dose of the drug if you skip a meal.
 - Do not consume alcohol while taking this drug.
 - Do not drive while taking this drug because the drug may increase sleepiness.
 - Increase your intake of water and other fluids while taking this drug.
 - Continue to follow your prescribed diet while taking this drug.
- 8 The nurse caring for a home-bound older adult who is losing 1 to 2 pounds monthly plans for which of the following? (Select all that apply.)
- Meals-on-Wheels deliveries
 - Ensure nutritional supplements
 - placement in a residential care facility
 - transportation to congregate senior meals
 - follow-up by primary care physician
 - referral for diagnostic studies
- 9 Which of the following is a high-priority nursing intervention to prevent malnutrition in the surgical client?
- aggressive pain management
 - daily weights
 - maintaining intravenous flow
 - requesting early restoration of oral intake
- 10 Three days after gastric bypass surgery, the client complains of increasing abdominal pain. Bowel sounds are absent; the abdomen is firm and very tender. The nurse should:
- report findings to the surgeon.
 - ambulate the client to promote peristalsis.
 - chart assessment data and continue to monitor.
 - evaluate the effectiveness of analgesia.

See Test Yourself answers in Appendix C.

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