47 Nutrition

LEARNING OUTCOMES

After completing this chapter, you will be able to:

1. Identify essential nutrients and their dietary sources.
2. Describe normal digestion, absorption, and metabolism of carbohydrates, proteins, and lipids.
3. Identify factors influencing nutrition.
4. Identify nutritional variations throughout the life cycle.
5. Evaluate a diet using a food guide pyramid.
6. Discuss essential components and purposes of nutritional assessment and nutritional screening.
7. Identify risk factors for and clinical signs of malnutrition.
8. Describe nursing interventions to promote optimal nutrition.
9. Discuss nursing interventions to treat clients with nutritional problems.
10. Verbalize the steps used in:
    a. Inserting a nasogastric tube.
    b. Removing a nasogastric tube.
    c. Administering a tube feeding.
    d. Administering a gastrostomy or jejunostomy tube feeding.
11. Recognize when it is appropriate to delegate aspects of feeding clients to unlicensed assistive personnel.
12. Plan, implement, and evaluate nursing care associated with nursing diagnoses related to nutritional problems.
13. Demonstrate appropriate documentation and reporting of nutritional therapy.

KEY TERMS

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INTRODUCTION

Nutrition is the sum of all the interactions between an organism and the food it consumes. In other words, nutrition is what a person eats and how the body uses it. **Nutrients** are organic and inorganic substances found in foods that are required for body functioning. Adequate food intake consists of a balance of nutrients: water, carbohydrates, proteins, fats, vitamins, and minerals. Foods differ greatly in their **nutritive value** (the nutrient content of a specified amount of food), and no one food provides all essential nutrients. Nutrients have three major functions: providing energy for body processes and movement, providing structural material for body tissues, and regulating body processes.

ESSENTIAL NUTRIENTS

The body's most basic nutrient need is water. Because every cell requires a continuous supply of fuel, the most important nutritional need, after water, is for nutrients that provide fuel, or energy. The energy-providing nutrients are carbohydrates, fats, and proteins. Hunger compels people to eat enough energy-providing nutrients to satisfy their energy needs. Carbohydrates, fats, protein, minerals, vitamins, and water are referred to as **macronutrients**, because they are needed in large amounts (e.g., hundreds of grams) to provide energy. **Micronutrients** are those vitamins and minerals that are required in small amounts (e.g., milligrams or micrograms) to metabolize the energy-providing nutrients.

Carbohydrates

Carbohydrates are composed of the elements carbon (C), hydrogen (H), and oxygen (O) and are of two basic types: simple carbohydrates (sugars) and complex carbohydrates (starches and fiber). Natural sources of carbohydrates also supply vital nutrients, such as protein, vitamins, and minerals that are not found in processed foods. Processed carbohydrate foods are relatively low in nutrients in relation to the large number of calories they contain. High sugar-content (and solid fat) foods are referred to as "empty calories." In addition, alcoholic beverages contain significant amounts of carbohydrate, but very few nutrients and, thus, they are also empty calories.

TYPES OF CARBOHYDRATES

SUGARS Sugars, the simplest of all carbohydrates, are water soluble and are produced naturally by both plants and animals. Sugars may be **monosaccharides** (single molecules) or **disaccharides** (double molecules). Of the three monosaccharides (glucose, fructose, and galactose), glucose is by far the most abundant simple sugar.

Most sugars are produced naturally by plants, especially fruits, sugar cane, and sugar beets. However, other sugars come from animal sources. For example, lactose, a combination of glucose and galactose, is found in animal milk. Processed or refined sugars (e.g., table sugar, molasses, and corn syrup) have been extracted and concentrated from natural sources.

Not all sugars have calories and not all sweeteners are sugars. Sugar substitutes are available from both natural and manufactured sources and have almost no calories. Often referred to as "artificial" sugar, noncaloric sweeteners including saccharin and aspartame are much sweeter than sugar by volume. Sugar alcohols such as erythritol and sorbitol are low in calories, do not contain ethanol (present in alcoholic beverages), and are often used in chewing gums. Some sweeteners are not easily categorized, such as the extract from the leaf of the stevia plant.

STARCHES Starches are the insoluble, nonsweet forms of carbohydrate. They are **polysaccharides**; that is, they are composed of branched chains of dozens, sometimes hundreds, of glucose molecules. Like sugars, nearly all starches exist naturally in plants, such as grains, legumes, and potatoes. Other foods, such as cereals, breads, flour, and puddings, are processed from starches.

FIBER Fiber, a complex carbohydrate derived from plants, supplies roughage, or bulk, to the diet. However, fiber cannot be digested by humans. This complex carbohydrate satisfies the appetite and helps the digestive tract to function effectively and eliminate waste. Fiber is present in the outer layer of grains, bran, and in the skin, seeds, and pulp of many vegetables and fruits.

CARBOHYDRATE DIGESTION

Major enzymes of carbohydrate digestion include ptyalin (salivary amylase), pancreatic amylase, and the disaccharidases: maltase, sucrase, and lactase. **Enzymes** are biologic catalysts that speed up chemical reactions. The desired end products of carbohydrate digestion are monosaccharides. Some simple sugars are already monosaccharides and require no digestion. Essentially, all monosaccharides are absorbed by the small intestine in healthy people.

CARBOHYDRATE METABOLISM

Carbohydrate metabolism is a major source of body energy. After the body breaks carbohydrates down into glucose, some glucose continues to circulate in the blood to maintain blood levels and to provide a readily available source of energy. The remainder is used as energy or stored. Insulin, a hormone secreted by the pancreas, enhances the transport of glucose into cells.

STORAGE AND CONVERSION

Carbohydrates are stored either as glycogen or as fat. **Glycogen** is a large polymer (compound molecule) of glucose. Almost all body cells can store glycogen; however, most is stored in the liver and skeletal muscles, where it is available for conversion back into glucose. Glucose that cannot be stored as glycogen is converted to fat.

Proteins

Amino acids, organic molecules made up primarily of carbon, hydrogen, oxygen, and nitrogen, combine to form proteins. Every cell in the body contains some protein, and about three quarters of body solids are proteins.

Amino acids are categorized as essential or nonessential. **Essential amino acids** are those that cannot be manufactured in the body and must be supplied as part of the protein ingested in the diet. Nine essential amino acids—histidine, isoleucine, leucine, lysine, methionine, phenylalanine, tryptophan, threonine, and valine—are necessary for tissue growth and maintenance. A tenth, arginine, appears to have a role in the immune system.

Nonessential amino acids are those that the body can manufacture. The body takes amino acids derived from the diet and reconstructs new ones from their basic elements. Nonessential amino acids include alanine, aspartic acid, cystine, glutamic acid, glycine, hydroxyproline, proline, serine, and tyrosine.

Proteins may be complete or incomplete. **Complete proteins** contain all of the essential amino acids plus many nonessential ones. Most animal proteins, including meats, poultry, fish, dairy products, and eggs, are complete proteins. Some animal proteins, however, contain less than the required amount of one or more essential amino acids and therefore cannot alone support continued growth. These proteins are sometimes referred to as partially complete proteins. Examples are gelatin, which has small amounts of tryptophan, and the milk protein casein, which has only a little arginine.

Incomplete proteins lack one or more essential amino acids (most commonly lysine, methionine, or tryptophan) and are usually derived from vegetables. If, however, an appropriate mixture of plant proteins is provided in the diet, a balanced ratio of essential amino acids can be achieved. For example, a combination of corn (low in tryptophan and lysine) and beans (low in methionine) is a complete protein. Such combinations of two or more vegetables are called *complementary proteins.* Another way to take full advantage of vegetable proteins is to eat them with a small amount of animal protein. Spaghetti with cheese, rice with pork, noodles with tuna, and cereal with milk are just a few examples of combining vegetable and animal proteins.

PROTEIN DIGESTION

Digestion of protein foods begins in the stomach, where the enzyme *pepsin* breaks protein down into smaller units. However, most protein is digested in the small intestine. The pancreas secretes the proteolytic enzymes trypsin, chymotrypsin, and carboxypeptidase; glands in the intestinal wall secrete aminopeptidase and dipeptidase. These enzymes break protein down into smaller molecules and eventually into amino acids.

STORAGE

Amino acids are absorbed by active transport through the small intestine into the portal blood circulation. The liver uses amino acids to synthesize specific proteins (e.g., liver cells and the plasma proteins albumin, globulin, and fibrinogen). Plasma proteins are a storage medium that can rapidly be converted back into amino acids.

Other amino acids are transported to tissues and cells throughout the body where they are used to make protein for cell structures. In a sense, protein is stored as body tissue. The body cannot actually store excess amino acids for future use. However, a limited amount is available in the "metabolic pool" that exists because of the constant breakdown and buildup of the protein in body tissues.

PROTEIN METABOLISM

Protein metabolism includes three activities: **anabolism** (building tissue), **catabolism** (breaking down tissue), and maintaining nitrogen balance.

ANABOLISM All body cells synthesize proteins from amino acids. The types of proteins formed depend on the characteristics of the cell and are controlled by its genes.

CATABOLISM Because a cell can accumulate only a limited amount of protein, excess amino acids are degraded for energy or converted to fat. Protein degradation occurs primarily in the liver.

NITROGEN BALANCE Because nitrogen is the element that distinguishes protein from lipids and carbohydrates, nitrogen balance reflects the status of protein nutrition in the body. **Nitrogen balance** is a measure of the degree of protein anabolism and catabolism; it is the net result of intake and loss of nitrogen. When nitrogen intake equals nitrogen output, a state of nitrogen balance exists.

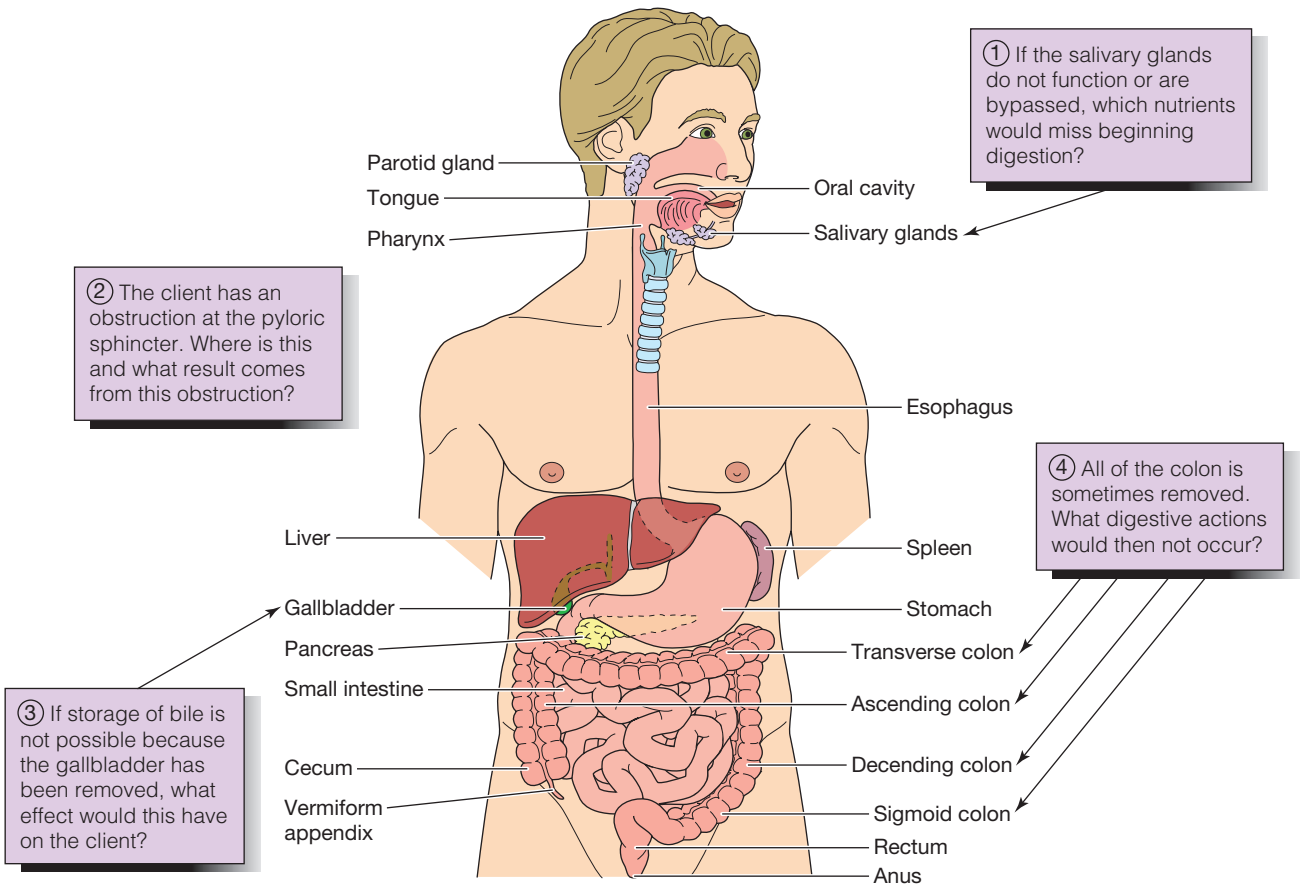
Lipids

Lipids are organic substances that are greasy and insoluble in water but soluble in alcohol or ether. **Fats** are lipids that are solid at room temperature; **oils** are lipids that are liquid at room temperature. In common use, the terms *fats* and *lipids* are used interchangeably. Lipids have the same elements (carbon, hydrogen, and oxygen) as carbohydrates, but they contain a higher proportion of hydrogen.

Fatty acids, made up of carbon chains and hydrogen, are the basic structural units of most lipids. Fatty acids are described as saturated or unsaturated, according to the relative number of hydrogen

ANATOMY & PHYSIOLOGY REVIEW

Digestive System



See student resource website for answers.

atoms they contain. **Saturated fatty acids** are those in which all carbon atoms are filled to capacity (i.e., saturated) with hydrogen; an example is butyric acid, found in butter. An **unsaturated fatty acid** is one that could accommodate more hydrogen atoms than it currently does. It has at least two carbon atoms that are not attached to a hydrogen atom; instead, there is a double bond between the two carbon atoms. Fatty acids with one double bond are called **monounsaturated fatty acids**; those with more than one double bond (or many carbons not bonded to a hydrogen atom) are **polyunsaturated fatty acids**. An example of a polyunsaturated fatty acid is linoleic acid, found in vegetable oil.

Based on their chemical structure, lipids are classified as simple or compound. **Glycerides**, the simple lipids, are the most common form of lipids. They consist of a glycerol molecule with up to three fatty acids attached. **Triglycerides** (which have three fatty acids) account for more than 90% of the lipids in food and in the body. Triglycerides may contain saturated or unsaturated fatty acids. Saturated triglycerides are found in animal products, such as butter, and are usually solid at room temperature. Unsaturated triglycerides are usually liquid at room temperature and are found in plant products, such as olive oil and corn oil.

Cholesterol is a fatlike substance that is both produced by the body and found in foods of animal origin. Most of the body's cholesterol is synthesized in the liver; however, some is absorbed from the diet (e.g., from milk, egg yolk, and organ meats). Cholesterol is needed to create bile acids and to synthesize steroid hormones. Along with phospholipids, large quantities of cholesterol are present in cell membranes and other cell structures.

LIPID DIGESTION

Although chemical digestion of lipids begins in the stomach, they are digested mainly in the small intestine, primarily by bile, pancreatic lipase, and enteric lipase, an intestinal enzyme. The end products of lipid digestion are glycerol, fatty acids, and cholesterol. These are immediately reassembled inside the intestinal cells into triglycerides and cholesterol esters (cholesterol with a fatty acid attached to it), which are not water soluble. For these reassembled products to be transported and used, the small intestine and the liver must convert them into soluble compounds called lipoproteins. **Lipoproteins** are made up of various lipids and a protein.

LIPID METABOLISM

Converting fat into usable energy occurs through the use of the enzyme hormone-sensitive lipase, which breaks down triglycerides in adipose cells, releasing glycerol and fatty acids into the blood. A pound of fat provides 3,500 kilocalories. Fasting individuals will obtain most of their calories from fat metabolism, but some amount of carbohydrate or protein must also be used because the brain, nerves, and red blood cells require glucose. Only the glycerol molecules in fat can be converted to glucose.

Micronutrients

A **vitamin** is an organic compound that cannot be manufactured by the body and is needed in small quantities to catalyze metabolic processes. Thus, when vitamins are lacking in the diet, metabolic deficits result. Vitamins are generally classified as fat soluble or water soluble. **Water-soluble vitamins** include C and the B-complex vitamins: B_1 (thiamine), B_2 (riboflavin), B_3 (niacin or nicotinic acid), B_6 (pyridoxine), B_9 (folic acid), B_{12} (cobalamin), pantothenic acid, and biotin. The body cannot store water-soluble vitamins; thus, people must get a daily supply in the diet. Water-soluble vitamins can be degraded by food processing, storage, and preparation.

Fat-soluble vitamins include A, D, E, and K. The body can store these vitamins, although there is a limit to the amounts of vitamins E and K the body can store. Therefore, a daily supply of fat-soluble vitamins is not absolutely necessary. Vitamin content is highest in fresh foods consumed soon after harvest.

Minerals are found in organic compounds, as inorganic compounds, and as free ions. Calcium and phosphorus make up 80% of all mineral elements in the body. The two categories of minerals are macrominerals and microminerals. **Macrominerals** are those that people require daily in amounts over 100 mg. They include calcium, phosphorus, sodium, potassium, magnesium, chloride, and sulfur. **Microminerals** are those that people require daily in amounts less than 100 mg. They include iron, zinc, manganese, iodine, fluoride, copper, cobalt, chromium, and selenium.

Common problems associated with the mineral nutrients are iron deficiency resulting in anemia, and osteoporosis resulting from loss of bone calcium. Additional information about major minerals associated with the body's fluid and electrolyte balance is given in Chapter 52 ∞.

ENERGY BALANCE

Energy balance is the relationship between the energy derived from food and the energy used by the body. The body obtains energy in the form of calories from carbohydrates, protein, fat, and alcohol. The body uses energy for voluntary activities such as walking and talking and for involuntary activities such as breathing and secreting enzymes. A person's energy balance is determined by comparing his or her energy intake with energy output.

Energy Intake

The amount of energy that nutrients or foods supply to the body is their **caloric value**. A **calorie** is a unit of heat energy. A **small calorie (c, cal)** is the amount of heat required to raise the temperature of 1 gram of water 1 degree Celsius. This unit of measure is used in chemistry and physics. A **large calorie (Calorie, kilocalorie [Kcal])** is the amount of heat energy required to raise the temperature of 1 gram of water 15 to 16 degrees Celsius and is the unit used in nutrition (although it is not universally capitalized). In the metric system, the measure is the **kilojoule (kJ)**. One Calorie (Kcal) equals 4.18 kilojoules.

The energy liberated from the metabolism of food has been determined to be:

- 4 Calories/gram (17 kJ) of carbohydrates
- 4 Calories/gram (17 kJ) of protein
- 9 Calories/gram (38 kJ) of fat
- 7 Calories/gram (29 kJ) of alcohol.

Energy Output

Metabolism refers to all biochemical and physiological processes by which the body grows and maintains itself. Metabolic rate is normally expressed in terms of the rate of heat liberated during these chemical reactions. The **basal metabolic rate (BMR)** is the rate at which the

body metabolizes food to maintain the energy requirements of a person who is awake and at rest. The energy in food maintains the basal metabolic rate of the body and provides energy for activities such as running and walking.

Resting energy expenditure (REE) is the amount of energy required to maintain basic body functions; in other words, the calories required to maintain life. The REE of healthy individuals is generally about 1 cal/kg of body weight/h for men and 0.9 cal/kg/h for women although there is great variation among individuals. BMR is calculated by measuring the REE in the early morning, 12 hours after eating.

The actual daily expenditure of energy depends on the degree of activity of the individual. Some activities require many times the REE. Examples of approximate real caloric expenditures compared to the REE are as follows:

Light housework	210%
Walking steadily	350%
Heavy housework	400%
Laboring	500%
Average jogging/cycling/energetic swimming	700%

BODY WEIGHT AND BODY MASS STANDARDS

Maintaining a healthy or ideal body weight requires a balance between the expenditure of energy and the intake of nutrients. Generally, when energy requirements of an individual equate with the daily caloric intake, the body weight remains stable. **Ideal body weight (IBW)** is the optimal weight recommended for optimal health. To determine an individual's approximate IBW, the nurse can consult standardized tables or can quickly calculate a value using the Rule of 5 for women and the Rule of 6 for men (Box 47–1). Many standardized tables and formulas were developed many years ago and are based on limited samples. The nurse should use great caution in suggesting that these weights apply to all clients.

Many health professionals consider the body mass index to be a more reliable indicator of a person's healthy weight. For people older than 18 years, the **body mass index (BMI)** is an indicator of changes in body fat stores and whether a person's weight is appropriate for height, and may provide a useful estimate of malnutrition. However, the results must be used with caution in people who have fluid retention (e.g., ascites or edema), athletes, or older adults. To calculate the BMI:

1. Measure the person's height in meters, e.g., 1.7 m (1 meter = 3.3 ft, or 39.6 in.)
2. Measure the weight in kilograms, e.g., 72 kg (1 kg = 2.2 pounds)
3. Calculate the BMI using the following formula:

$$\text{BMI} = \frac{\text{weight in kilograms}}{(\text{height in meters})^2}$$

or

$$\frac{72 \text{ kilograms}}{1.7 \times 1.7 \text{ meters}} = 24.9$$

Box 47–2 provides an interpretation of the results.

Another measure of body mass is percent body fat. Because BMI uses only height and weight, it can give misleading results for certain groups of clients such as athletes, frail older adults, and children. The most accurate percentage of body fat can be measured by underwater weighing and dual-energy x-ray absorptiometry (DEXA), but these methods are time consuming and expensive (Roth, 2014). Other indirect, but more practical measures include waist circumference (see Box 47–2), skinfold testing, and bioelectrical impedance analysis.

BOX 47–1 Approximating Ideal Body Weight

Rule of 5 for Females	Rule of 6 for Males
100 lb for 5 ft of height	106 lb for 5 ft of height
+ 5 lb for each inch over 5 ft	+ 6 lb for each inch over 5 ft
±10% for body-frame size*	±10% for body-frame size*

*Determine body-frame size by measuring the client's wrist circumference and applying to the table below. Add 10% for large body-frame size, and subtract 10% for small body-frame size.

	Female Wrist Measurements			Male Wrist Measurements
	Height Less Than 5′2″ (Less Than 155 cm)	Height 5′2″–5′5″ (155–163 cm)	Height More Than 5′5″ (More Than 163 cm)	Height More Than 5′5″ (More Than 163 cm)
Small	Less than 5.5″ (140 mm)	Less than 6.0″ (152 mm)	Less than 6.25″ (159 mm)	5.5″–6.5″ (140–165 mm)
Medium	5.5″–5.75″ (140–146 mm)	6″– 6.25″ (152–159 mm)	6.25″–6.5″ (159–165 mm)	6.5″–7.5″ (165–191 mm)
Large	More than 5.75″ (146 mm)	More than 6.25″ (159 mm)	More than 6.5″ (165 mm)	More than 7.5″ (191 mm)

BOX 47–2 Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risks*

			Disease Risk* Relative to Normal Weight and Waist Circumference	
	BMI (kg/m^2)	Obesity Class	Men: 102 cm (40 in.) or Less Women: 88 cm (35 in.) or Less	Men > 102 cm (40 in.) Women > 88 cm (35 in.)
Underweight	<18.5		—	—
Normal+	18.5–24.9		—	—
Overweight	25.0–29.9		Increased	High
Obesity	30.0–34.9	I	High	Very high
	35.0–39.9	II	Very high	Very high
Extreme obesity	40.0+	III	Extremely high	Extremely high

*Disease risk for type 2 diabetes, hypertension, and cardiovascular disease.

+Increased waist circumference can also be a marker for increased risk even in individuals of normal weight.

From *Aim for a Healthy Weight*, National Heart, Lung, and Blood Institute, n.d., Washington, DC: U.S. Department of Health & Human Services. Retrieved from http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/bmi_dis.htm

FACTORS AFFECTING NUTRITION

Although the nutritional content of food is an important consideration when planning a diet, an individual's food preferences and habits are often a major factor affecting actual food intake. Habits about eating are influenced by developmental considerations, gender, ethnicity and culture, beliefs about food, personal preferences, religious practices, lifestyle, economics, medications and therapy, health, alcohol consumption, advertising, and psychological factors.

Development

People in rapid periods of growth (i.e., infancy and adolescence) have increased needs for nutrients. Older adults, on the other hand, may need fewer calories and also need some dietary changes in view of their risk for coronary heart disease, osteoporosis, and hypertension.

Sex

Nutrient requirements are different for men and women because of body composition and reproductive functions. The larger muscle mass of men translates into a greater need for calories and proteins. Because of menstruation, women require more iron than men do prior to menopause. Pregnant and lactating women have increased caloric and fluid needs.

Ethnicity and Culture

Ethnicity often determines food preferences. Traditional foods (e.g., rice for Asians, pasta for Italians, curry for Indians) are eaten long after other customs are abandoned.

Nurses should not use a "good food, bad food" approach, but rather should realize that variations of intake are acceptable under different circumstances. The only "universally" accepted guidelines are (a) to eat a wide variety of foods to furnish adequate nutrients and (b) to eat moderately to maintain body weight. Food preference probably differs as much among individuals of the same cultural background as it does between cultures. Not all Italians like pizza, for example, and many undoubtedly enjoy Mexican food.

Beliefs About Food

Beliefs about effects of foods on health and well-being can affect food choices. Many people acquire their beliefs about food from television, magazines, and other media. Some people are reducing their intake of animal fats in response to evidence that excessive consumption of animal fats is a major risk factor in vascular disease, including heart attack and stroke.

Food fads that involve nontraditional food practices are relatively common. A **fad** is a widespread but short-lived interest or a practice followed with considerable zeal. It may be based either on the belief that certain foods have special powers or on the notion that certain foods are harmful. Food fads appeal to the individual seeking a miracle cure for a disease, the person who desires superior health, or someone who wants to delay aging. Some fad diets are harmless, but others are potentially dangerous. Determining the needs a fad diet fills for the client enables the nurse both to support these needs and to suggest a more nutritious diet.

Personal Preferences

People develop likes and dislikes based on associations with a typical food. A child who loves to visit his grandparents may love pickled crabapples because they are served in the grandparents' home. Another child who dislikes a very strict aunt grows up to dislike the chicken casserole she often prepared. People often carry such preferences into adulthood.

Culturally Responsive Care

PATIENT-CENTERED CARE

Selected Variations in Nutritional Practices and Preferences Among Different Cultures

AFRICAN AMERICAN HERITAGE
- Gifts of food are common and should never be rejected.
- Diets are often high in fat, cholesterol, and sodium.
- Being overweight may be viewed as positive.
- Popular vegetables include black-eyed peas, okra, sweet potatoes, peanuts, corn, hot and sweet peppers, green and lima beans, and collard, turnip, and mustard greens.

ARAB HERITAGE
- Many spices and herbs are used such as cinnamon, allspice, cloves, mint, ginger, and garlic.
- Meats are often skewer roasted or slow simmered; most common are lamb and chicken.
- Bread is served at every meal.
- Muslims do not eat pork, and all meats must be cooked well done.
- Food is eaten (and clients fed) with the right hand.
- Beverages are drunk after the meal, not during; alcohol is prohibited.
- Muslims fast during daylight hours during the month of Ramadan (the ninth month of the year based on the lunar calendar).

CHINESE HERITAGE
- Foods are served at meals in a specific order.
- Each region in China has its own traditional diet.
- Traditional Chinese may not want ice in their drinks.
- Foods are chosen to balance *yin* and *yang* in order to avoid indigestion.
- Soy sauce is used instead of salt.

JEWISH HERITAGE
- Dietary laws govern killing, preparation, and eating of foods.
- Meat and animal milk are not eaten at the same time; dairy substitutes (e.g., margarine) are permitted.
- Pork is one meat that is forbidden to eat.
- All blood must be drained from meats.
- Always wash hands before eating.

MEXICAN HERITAGE
- Rice, beans, and tortillas are core, essential foods.
- Larger body size may be viewed as a positive attribute.
- Sweet fruit drinks, including adding sugar to juice, are popular.
- The main meal of the day is at noontime.
- Foods are chosen according to *hot* and *cold* theory.

NAVAJO HERITAGE
- Rites of passage and ceremonies are celebrated with food.
- Herbs are used to treat many illnesses.
- Sheep are the major source of meat.
- Squash and corn are major vegetables.

Individual likes and dislikes can also be related to familiarity. Children often say they dislike a food before they sample it. Some adults are very adventuresome and eager to try new foods. Others prefer to eat the same foods repeatedly. Preferences in the tastes, smells, flavors (blends of taste and smell), temperatures, colors, shapes, and sizes of food influence a person's food choices. Some people may prefer sweet and sour tastes to bitter or salty tastes. Textures play a great role in food preferences. Some people prefer crisp food to limp food, firm to soft, tender to tough, smooth to lumpy, or dry to soggy.

Religious Practices

Religious practice also affects diet. Some Roman Catholics avoid meat on certain days, and some Protestant faiths prohibit meat, tea, coffee, or alcohol. Both Orthodox Judaism and Islam prohibit pork. Orthodox Jews observe kosher customs, eating certain foods only if they are inspected by a rabbi and prepared according to dietary laws. The nurse must plan care with consideration of such religious dietary practices.

Lifestyle

Certain lifestyles are linked to food-related behaviors. People who are always in a hurry probably buy convenience grocery items or eat restaurant meals. People who spend many hours at home may take time to prepare more meals "from scratch." Individual differences also influence lifestyle patterns (e.g., cooking skills, concern about health). Some people work at different times, such as evening or night shifts. They might need to adapt their eating habits to this and also make changes in their medication schedules if they are related to food intake.

Muscular activity affects metabolic rate more than any other factor; the more strenuous the activity, the greater the stimulation of the metabolism. Mental activity, which requires only about 4 Kcal per hour, provides very little metabolic stimulation.

Economics

What, how much, and how often a person eats are frequently affected by socioeconomic status. For example, people with limited income, including some older adults, may not be able to afford meat and fresh vegetables. In contrast, people with higher incomes may purchase more proteins and fats and fewer complex carbohydrates. Not all individuals have the financial resources for extensive food preparation and storage facilities. The nurse should not assume that clients have their own stove, refrigerator, or freezer. In some low-income areas, food costs at small local grocery stores can be significantly higher than at large chain stores farther away.

Medications and Therapy

The effects of drugs on nutrition vary considerably. They may alter appetite, disturb taste perception, or interfere with nutrient absorption or excretion. Nurses need to be aware of the nutritional effects of specific drugs when evaluating a client for nutritional problems. The nursing history interview should include questions about the medications the client is taking. Conversely, nutrients can affect drug utilization. Some nutrients can decrease drug absorption; others enhance absorption. For example, the calcium in milk hinders absorption of the antibiotic tetracycline but enhances the absorption of the antibiotic erythromycin. Older adults are at particular risk for drug–food interactions due to the number of medications they may take, age-related physiological changes affecting medication actions (e.g., decrease in lean-to-fat ratio, decrease in renal or hepatic function), and disease-restricted diets. Selected drug and nutrient interactions are shown in Table 47–1.

Therapies prescribed for certain diseases (e.g., chemotherapy and radiation for cancer) may also adversely affect eating patterns and nutrition. Normal cells of the bone marrow and the gastrointestinal (GI) mucosa are naturally very active and particularly susceptible to antineoplastic agents. Oral ulcers, intestinal bleeding, or diarrhea resulting from the toxicity of the antineoplastic agents used in chemotherapy can seriously diminish a person's nutritional status.

The effects of radiotherapy depend on the area that is treated. Radiotherapy of the head and neck may cause decreased salivation, taste distortions, and swallowing difficulties; radiotherapy of the abdomen and pelvis may cause malabsorption, nausea, vomiting, and diarrhea. Many clients undergoing radiotherapy feel profound fatigue and anorexia (loss of appetite).

Health

An individual's health status greatly affects eating habits and nutritional status. Missing teeth, ill-fitting dentures, or a sore mouth makes chewing food difficult. Difficulty swallowing (**dysphagia**) due to a painfully inflamed throat or a stricture of the esophagus can prevent a person from obtaining adequate nourishment. Disease processes and surgery of the GI tract can affect digestion, absorption, metabolism, and excretion of essential nutrients. GI and other diseases also create nausea, vomiting, and diarrhea, all of which can adversely affect a person's appetite and nutritional status. Gallstones, which can block the flow of bile, are a common cause of impaired lipid digestion. Metabolic processes can be impaired by diseases of the liver. Diseases of the pancreas can affect glucose metabolism or fat digestion. Autoimmune and genetic disorders such as celiac disease and irritable bowel syndrome may be worsened when eating foods containing wheat or gluten.

Between 30 million and 50 million Americans have lactose intolerance (also called lactose maldigestion), a shortage of the enzyme lactase, which is needed to break down the sugar in milk. Certain populations are more widely affected, especially African Americans, American Indians, Ashkenazi Jews, and Asian Americans, although they may not always show symptoms (DeBruyne & Pinna, 2014).

Alcohol Consumption

The calories in alcoholic drinks include both those of the alcohol itself and of the juices or other beverages added to the drink. These can constitute large numbers of calories, for example, 150 calories for a regular 12-ounce beer, and 160 calories for a "screwdriver" (1.5 ounces vodka plus 4 ounces orange juice). Drinking alcohol can lead to weight gain through adding these calories to the regular diet plus the effect of alcohol on fat metabolism. A small amount of the alcohol is converted directly to fat. However, the greater effect is that the remainder of the alcohol is converted into acetate by the liver. The acetate released to the bloodstream is used for energy instead of fat and the fat is then stored.

Excessive alcohol use contributes to nutritional deficiencies in several ways. Alcohol may replace food in a person's diet, and it can depress the appetite. Excessive alcohol can have a toxic effect on the intestinal mucosa, thereby decreasing the absorption of nutrients.

TABLE 47–1 Selected Drug–Nutrient Interactions

Drug	Effect On Nutrition
Acetylsalicylic acid (aspirin)	Decreases serum folate and folacin nutrition. Increases excretion of vitamin C, thiamine, potassium, amino acids, and glucose. May cause nausea and gastritis.
Antacids containing aluminum or magnesium hydroxide	Decrease absorption of phosphate and vitamin A. Inactivate thiamine. May cause deficiency of calcium and vitamin D. Increase excretion of sodium, potassium, chloride, calcium, magnesium, zinc, and riboflavin.
Thiazide diuretics	May cause anorexia, nausea, vomiting, diarrhea, or constipation. Decrease absorption of vitamin B_{12}. May cause diarrhea, nausea, or vomiting.
Potassium chloride	Increases excretion of potassium, magnesium, and calcium. May cause anorexia, nausea, or vomiting. Is incompatible with protein hydrolysates.
Laxatives	May cause calcium and potassium depletion. Mineral oil and phenolphthalein (Ex-Lax) decrease absorption of vitamins A, D, E, and K.
Antihypertensives	Hydralazine may cause anorexia, vomiting, nausea, and constipation. Methyldopa increases need for vitamin B_{12} and folate. May cause dry mouth, nausea, vomiting, diarrhea, and constipation.
Anti-inflammatory agents	Colchicine decreases absorption of vitamin B_{12}, carotene, fat, lactose, sodium, potassium, protein, and cholesterol. Prednisone decreases absorption of calcium and phosphorus.
Antidepressants	Amitriptyline increases food intake (large amounts may suppress intake).
Antineoplastics	Can cause nausea, vomiting, anorexia, malabsorption, and diarrhea.
Nutrient	**Effect on Drugs**
Grapefruit	Can cause toxicity when taken with a variety of medications including amiodarone, carbamazepine, cisapride, cyclosporine, diazepam, nifedipine, saquinavir, statins, terfenadine, verapamil.
Vitamin K	Can decrease the effectiveness of warfarin (Coumadin).
Tyramine (found in aged cheeses, tap beer, dried sausages, fermented soy, sauerkraut)	In combination with monoamine oxidase inhibitor (MAOI) medications, e.g., isocarboxazid (Marplan), isoniazid, linezolid, phenelzine, tranylcypromine, creates sudden increase in epinephrine leading to headaches, increased pulse and blood pressure, and possible death.
Milk	Interferes with absorption of tetracycline antibiotics.

The need for vitamin B increases, because it is used in alcohol metabolism. Alcohol can impair the storage of nutrients and increase nutrient catabolism and excretion.

Several studies have shown health benefits of moderate alcohol consumption. Examples include reduced risk of cardiovascular disease, strokes, dementia, diabetes, and osteoporosis. However, any benefits of alcohol must be weighed against the many harmful effects, and the possibility of alcohol abuse.

Advertising

Food producers try to persuade people to change from the product they currently use to the brand of the producer. Popular actors are often used in television, radio, Internet, and print to influence consumers' choices. Advertising is thought to influence people's food choices and eating patterns to a certain extent. Of note is that such products as alcoholic beverages, coffee, frozen foods, and soft drinks are more heavily advertised than such products as bread, vegetables, and fruits. Convenience foods (frozen or packaged and easy to prepare) and take-out (fast) foods are heavily advertised. Children's television show commercials often promote snack foods, candy, soda, and sugared cereals over fresh, healthy foods. Australia, Canada, Sweden, and Great Britain have adopted regulations prohibiting food advertising on programs targeting audiences of young children.

There has been an increase in advertising that targets older adults in particular and encourages use of herbs and supplements. Some products are nutritionally safe, whereas others are not and can cause interactions with medications they might be taking or cause unexpected side effects. The cost of some of these supplements is also usually high, is generally not covered by health insurance, and may take money that the person could spend for healthier food.

Psychological Factors

Although some people overeat when stressed, depressed, or lonely, others eat very little under the same conditions. Anorexia and weight loss can indicate severe stress or depression. Anorexia nervosa and bulimia are severe psychophysiological conditions seen most frequently in female adolescents.

NUTRITIONAL VARIATIONS THROUGHOUT THE LIFE CYCLE

Nutritional requirements vary throughout the life cycle. Guidelines follow for the major developmental stages.

Neonate to 1 Year

The neonate's fluid and nutritional needs are met by breast milk or formula. Fluid needs of infants are proportionately greater than those of adults because of a higher metabolic rate, immature kidneys, and greater water losses through the skin and the lungs. Therefore, fluid balance is a critical factor. Under normal environmental conditions, infants do not need additional water beyond that obtained from breast or bottle formula feedings; however, neonates in very warm environments may require additional fluids.

The total daily nutritional requirement of the newborn is about 80 to 100 mL of breast milk or formula per kilogram of body weight. The newborn infant's stomach capacity is about 90 mL, and feedings are required every 2 1/2 to 4 hours.

The newborn infant is usually fed "on demand." **Demand feeding** means that the child is fed when hungry rather than on a set time schedule. This method tends to decrease the problem of overfeeding or underfeeding the infant. The newborn who is hungry usually cries and exhibits tension in the entire body. During feeding, the infant sucks readily and needs burping after each ounce of formula or after 5 minutes of breast-feeding.

Infants demonstrate satisfaction by slowing their sucking activity or by falling asleep. Infants should not be coaxed into finishing the feeding. This could lead to discomfort or overfeeding. When feeding is completed, healthy infants can be placed in a supine position for sleep during the first 6 months of life to reduce the risk of sudden infant death syndrome (SIDS).

Regurgitation, or spitting up, during or after a feeding is a common occurrence during the first year. Although this may concern parents, it does not usually result in nutritional deficiency. Demonstration of adequate weight gain should reassure parents that the infant is receiving adequate nutrition.

Adding solid food to the diet usually takes place between 4 and 6 months of age. Six-month-old infants can consume solid food more readily because they can sit up, can hold a spoon, and have decreased sucking and tongue protrusion reflexes. Solid foods (strained or pureed) are generally introduced in the following order: cereals (rice before oat and wheat), fruits, vegetables (yellow before green), and strained meats. Foods are introduced one at a time, usually with only one new food introduced every 5 days to ensure that the infant tolerates the food and demonstrates no allergy to it. This sequence can vary according to cultural preferences. With the eruption of teeth at about 7 to 9 months, the infant is ready to chew and can experience different textures of food. At this time, the infant enjoys finger foods, such as skinless fruit cut into small pieces to prevent choking, dry cereal, or toast.

Because honey can contain spores of *Clostridium botulinum* and this has been a source of infection (and death) for infants, children less than 12 months old should not be fed honey. According to the Centers for Disease Control and Prevention (CDC) (2011), honey is safe for persons 1 year of age and older.

At about 6 months of age, infants require iron supplementation to prevent **iron deficiency anemia**. Iron deficiency anemia is a form of **anemia** (decrease in red blood cells) caused by inadequate supply of iron for synthesis of hemoglobin. Cow's milk is low in iron and, thus, iron-fortified cereals or formulas are usually recommended by 6 months of age and are continued until the child reaches 18 months.

Weaning from the breast or bottle to the cup takes place gradually and is usually achieved by 12 to 24 months of age. It is recommended that infants be breast-fed exclusively for 6 months and then until 1 year of age or longer as desired (American Academy of Pediatrics, 2012). Some infants have difficulty giving up the bottle, particularly at naptime or bedtime. Parents should be warned that having the bottle in bed could lead to **bottle mouth syndrome**. The term describes decay of the teeth caused by constant contact with sweet liquid from the bottle. Some dentists advocate brushing or cleaning the infant's teeth to prevent bottle mouth syndrome, especially for the infant who requires a bottle only at naptime or bedtime. Weaning from the bottle can be facilitated by diluting the formula with water increasingly until the infant is drinking plain water. By the age of 1, most infants can be completely fed on table food, and milk intake is about 20 ounces per day.

Toddler

Because of a maturing GI tract, toddlers can eat most foods and adjust to three meals each day. Toddlers' fine motor skills are sufficiently well developed for them to learn how to feed themselves. Before the age of 20 months, most toddlers require help with glasses and cups because their wrist control is limited. By age 3, when most of the deciduous teeth have emerged, the toddler can bite and chew adult table food.

Developing independence may be exhibited through the toddler's refusal of certain foods. Meals should be short because of the toddler's brief attention span and environmental distractions. Often toddlers display their liking of rituals by eating foods in a certain order, cutting foods a specific way, or accompanying certain foods with a particular drink.

The toddler is less likely to have fluid imbalances than the infant. The toddler's GI function is more mature, and the percentage of fluid body weight is lower. A healthy toddler weighing 15 kg (33 lb) needs about 1,250 mL of fluid per 24 hours.

During the toddler stage, the caloric requirement is 1,000 to 1,400 Kcal/day. From 1 to 2 years of age, the toddler may eat a combination of prepared toddler foods and some table foods. Parents should be instructed to read labels carefully and be aware that table foods offer more variety and are less expensive and more nutritious than prepared toddler foods. The need for adequate iron, calcium, and vitamins C and A, which are common toddler deficiencies, should also be discussed.

The following suggestions may help parents meet the child's nutritional needs and promote effective parent–child interactions: (a) Make mealtime a pleasant time by avoiding tensions at the table and discussions of bad behavior; (b) offer a variety of simple, attractive foods in small portions, and avoid meals that combine foods into one dish, such as a stew; (c) do not use food as a reward or punish a child who does not eat; (d) schedule meals, sleep, and snack times that will allow for optimum appetite and behavior; and (e) avoid the routine use of sweet desserts.

Preschooler

The preschooler eats adult foods. Parents should become informed about the diet of their child in day care or preschool settings so that they can ensure that the child's total nutritional needs are being met. Children at this age are very active and may rush through meals to return to playing. Active children often require snacks between meals. Cheese, fruit, yogurt, raw vegetables, and milk are good choices. The 4-year-old still requires parents' help in cutting meat and may spill milk when pouring from a large container. Parents also need to teach the preschooler how to use utensils and should provide them with the opportunity to practice (e.g., buttering bread). However, 4- and 5-year-olds often use their fingers to pick up food. Children at this age may enjoy helping in the kitchen, and both girls and boys should be encouraged to do so.

The preschooler is even less at risk than the toddler for fluid imbalances. The average 5-year-old weighing 20 kg (45 lb) requires at least 75 mL of liquid per kilogram of body weight per day, or 1,500 mL every 24 hours.

School-Age Child

School-age children require a balanced diet including approximately 1,600 to 2,200 Kcal/day. They can eat three meals a day and one or two nutritious snacks. Children need a protein-rich food at breakfast to sustain the prolonged physical and mental effort required at school. Children who skip breakfast become inattentive and restless by late morning and have decreased problem-solving ability. Undernourished children become fatigued easily and face a greater risk of infection, resulting in frequent absences from school.

The average healthy 8-year-old weighing 30 kg (66 lb) requires about 1,750 mL of fluid per day. Many school-age children have only one meal a day with their family, at dinner. Mealtime should be a social time enjoyed by all, and parents should encourage good eating habits. Parents should be aware that children learn many of their food habits by observing their parents. Eating a balanced diet should be the norm for both parent and child.

The school-age child generally eats lunch at school. The child may bring lunch from home or get lunch at the school. Many dietary problems stem from this independence in food choices. Children may trade their food, not eat lunch at all, or buy sweets or junk food with their lunch money. Parents should discuss with the child the foods that they should eat and continue to provide a balanced diet in the home setting.

Poor eating habits may cause obesity. Childhood obesity is an increasing problem. More than 18% of American children ages 6 to 18 are overweight (at or above the 95% for BMI) (Ogden, Carroll, Kit, & Flegal, 2012). Obesity in school-age children tends to result in adult obesity and all the related health risks. It is both caused by and results in decreased activity and psychosocial problems. Obese children may be ridiculed and discriminated against by peers. Such behavior reinforces low self-esteem. The CDC's Division of Adolescent and School Health has established many programs to address both prevention and treatment of childhood obesity. The goal of treatment for children who are overweight is to reduce weight gain, allowing their weight to increase more slowly than their height. Counseling and teaching for parents should include the following:

- Reviewing the child's eating habits, including snacks
- Altering meal content
- Using rewards other than food
- Promoting regular exercise.

Adolescent

The adolescent's need for nutrients and calories increases, particularly during the growth spurt. In particular, the need for protein, calcium, vitamin D, iron, and B vitamins increases during adolescence. An adequate diet for an adolescent is 1 quart of milk per day and appropriate amounts of meat, vegetables, fruits, breads, and cereals. Calcium intake during adolescent years (1,200 to 1,500 mg/day) may help decrease osteoporosis (a decrease in bone density) in later life. Peak bone mineralization occurs on average at 12.5 years in girls and 14.0 years in boys when 40% of total adult bone mass is accumulated. The majority of adolescents do not get enough calcium (Roth, 2014).

Many parents observe that teenagers, particularly boys, seem to eat all the time. Teenagers have active lifestyles and irregular eating patterns. They tend to diet or snack frequently, often eating high-calorie foods such as soft drinks, ice cream, and fast foods. Parents and nurses can promote better lifelong eating habits by encouraging teenagers to eat healthy snacks. Parents can provide healthy snacks such as fruits and cheese and limit the junk food available in the home. The teenager's food choices relate to physical, social, and emotional factors and impulses and may not be influenced by teaching. Nurses need to advise parents to help adolescents take responsibility for their decisions in many areas of life, and to avoid conflicts that relate to food.

Common problems related to nutrition and self-esteem among adolescents include obesity, anorexia nervosa, and bulimia. Obesity continues to be a problem in the adolescent period. Depression is not unusual among adolescents who are obese. Treatment of obesity in this age group includes education on nutrition and assessment of psychosocial problems that may produce overeating.

Under social pressure to be slim, some adolescents severely limit their food intake to a level significantly below that required to meet the demands of normal growth. Sometimes, the adolescent may develop an eating disorder, such as anorexia or bulimia. These disorders are considered to be related to the need for control. **Anorexia nervosa** is characterized by a prolonged inability or refusal to eat, rapid weight loss, and emaciation in individuals who continue to believe they are fat. People with anorexia may also induce vomiting and use laxatives and diuretics to remain thin. **Bulimia** is an uncontrollable compulsion to consume enormous amounts of food (binge) and then expel it by self-induced vomiting or by taking laxatives (purge). These illnesses are most effectively treated in the early stages by psychotherapy. Hospitalization may be necessary when the effects of starvation become life threatening.

Young Adult

Many young adults are aware of the food groups but may not be knowledgeable about how many servings of each group they need or how much a serving constitutes. The nurse should provide the young adult client with resources such as a chart or list that contains the foods and the amounts needed in each category.

Young adult females need to maintain adequate iron intake. Many women do not ingest sufficient dietary iron each day. To prevent iron deficiency anemia, menstruating females should ingest 18 mg of iron daily. The nurse should instruct the female client to include iron-rich foods, such as organ meats (liver and kidneys), eggs, fish, poultry, leafy vegetables, and dried fruits, in her daily diet. Go to nursing.pearsonhighered.com to download the Nutritional Reference Guide. In addition, the World Health Organization (WHO) recommends folate/folic acid supplements for all women of childbearing ability. Because folate can prevent neural tube defects in the fetus but must be taken prior to and during the early portion of the pregnancy, the United States and more than 50 other countries have mandated folic acid supplementation of enriched grain products.

Calcium is needed in young adulthood to maintain bones and help decrease the chances of developing osteoporosis in later life. Along with calcium, the person must have adequate vitamin D, necessary for the calcium to enter the bloodstream. Vitamin D is made in the skin on exposure to the sun. If the person does not get sufficient sun exposure (15 minutes three times each week), supplements may be indicated.

Obesity may occur during the young adult years as the active teen becomes the sedentary adult but does not decrease caloric intake. The young adult who is overweight or obese is at risk for hypertension, a major health problem for this age group.

DRUG CAPSULE

Mineral ferrous sulfate (Slow-Fe, Feosol), ferrous gluconate (Fergon)

CLIENT WITH IRON DEFICIENCY ANEMIA

Iron is required for the formation of red blood cells. When iron stores are low, the body cannot produce enough red blood cells and anemia can develop. Symptoms of iron deficiency anemia include fatigue, listlessness, anorexia, and pallor. Although iron deficiency anemia is not the only kind of anemia, it is possibly the most common and one of the easiest to treat. Immediate and timed-release forms are available.

NURSING RESPONSIBILITIES

- Administer on an empty stomach, 1 hour before or 2 hours after meals, with a full glass of water. If the client experiences gastric upset, administer with or after food. The immediate-release formulation is administered up to three times per day.
- Vitamin C increases absorption of iron from the stomach. Some preparations contain both iron and vitamin C.
- Administer at least 2 hours apart from antacids, ciprofloxacin, tetracycline, and several other medications. Consult a drug handbook for possible drug interactions.
- Liquid forms should be diluted in a glass of water or juice and sipped through a straw to prevent staining of the teeth.
- Shake suspension forms well before each use; take with a full glass of water.
- Iron comes in different dose strengths and may require adjustment for optimal effect.

CLIENT AND FAMILY TEACHING

- Take the medication on an empty stomach, 1 hour before or 2 hours after meals, with a full glass of water. If upset stomach occurs, take with or after food, but not with coffee, tea, eggs, or milk because these decrease absorption. Do not lie down for 30 minutes after taking the tablet or capsule.
- Sustained-release capsules and tablets must be swallowed whole. Do not crush or chew them because side effects may be increased.
- Common side effects may include nausea, stomach cramps, vomiting, and constipation. These should decrease within a few days even while continuing the iron.
- Stools will turn green-black, and this is normal.
- Do not stop taking the medication, even if you feel stronger.
- Do not take iron without consulting the primary care provider if you have a history of intestinal problems.
- Store at room temperature, away from moisture and sunlight. Keep away from children. Accidental overdose can be fatal.

Note: Prior to administering any medication, review all aspects with a current drug handbook or other reliable source.

Hypertension and obesity are 2 of more than 40 risk factors identified in the development of cardiovascular (CV) disease. Preventing these risk factors and lowering the risk of CV disease are critical. Low-fat and/or low-cholesterol diets play a significant role in both the prevention and treatment of CV disease.

Middle-Aged Adult

The middle-aged adult should continue to eat a healthy diet, following the recommended portions of the food groups, with special attention to protein and calcium intake, and limiting cholesterol and caloric intake. Two or three liters of fluid should be included in the daily diet. Postmenopausal women need to ingest sufficient calcium and vitamin D to reduce osteoporosis, and antioxidants such as vitamins A, C, and E may be helpful in reducing the risks of heart disease in women. Although iron supplements are no longer needed, the amount in a multivitamin is not harmful.

Middle-aged adults who gain weight may not be aware of some common facts about this age period. Decreased metabolic activity and decreased physical activity mean a decrease in caloric need. The nurse's role in nutritional health promotion is to counsel clients to prevent obesity by reducing caloric intake and participating in regular exercise. Clients should also be warned that being overweight is a risk factor for many chronic diseases, such as diabetes and hypertension, and for problems of mobility, such as arthritis.

For the client who requires additional resources, a variety of programs is frequently available. Most programs use behavior modification techniques and group support to assist clients in reaching their goals. Clients should seek medical advice before considering any major changes in their diets.

During late middle age, gastric juice secretions and free acid gradually decline. Some individuals may complain of "heartburn" (acid indigestion) or an increase in belching. They may determine that certain foods disagree with them. Clients should be advised to develop sensible eating habits and avoid fried or fatty foods.

Older Adults

The older adult requires the same basic nutrition as the younger adult. However, fewer calories are needed by older adults because of the lower metabolic rate and the decrease in physical activity.

Some older adults may need more carbohydrates for fiber and bulk, but most nutrient requirements remain relatively unchanged. Such physical changes as tooth loss and impaired sense of taste and smell may affect eating habits. Decreased saliva and gastric juice secretion may also affect a person's nutrition.

Psychosocial factors may also contribute to nutritional problems. Some older adults who live alone do not want to cook for themselves or eat alone. They may adopt poor dietary habits. Other factors, such as lack of transportation, poor access to stores, and inability to prepare the food also affect nutritional status. Loss of spouse, anxiety, depression, dependence on others, and lowered income all affect eating habits (Table 47–2). Guidelines to include high-nutrient foods compatible with the nutritional needs of older adults are summarized in Client Teaching and in the Nutritional Reference Guide. Go to nursing.pearsonhighered.com to download the Nutritional Reference Guide. Also see Lifespan Considerations on pages 1138–1139.

STANDARDS FOR A HEALTHY DIET

Various daily food guides have been developed to help healthy people meet the daily requirements of essential nutrients and to facilitate meal planning. Food group plans emphasize the general types or groups of foods rather than the specific foods, because related foods are similar in composition and often have similar nutrient values. For example, all grains, whether wheat or oats, are significant sources of carbohydrate, iron, and the B vitamin thiamine. Food guides currently used include *Dietary Guidelines for Americans* and the U.S. Department of Agriculture's (USDA's) Food Guidance System (MyPlate, MyPyramid, food guide pyramids).

TABLE 47–2 Problems Associated with Nutrition in Older Adults

Problems	Nursing Interventions
Difficulty chewing	Encourage regular visits to the dentist to have dentures repaired, refitted, or replaced. Chop fruits and vegetables finely; shred green, leafy vegetables; select ground meat, poultry, or fish.
Lowered glucose tolerance	Eat more complex carbohydrates (e.g., breads, cereals, rice, pasta, potatoes, and legumes) rather than sugar-rich foods.
Decreased social interaction, loneliness	Promote appropriate social interaction at meals, when possible. Encourage the client and family to take an interest in food preparation and serving, perhaps as an activity they can do together. Encourage family or caregivers to present the food at a dining table with place mats, tablecloths, and napkins to trigger eating associations for the older adult. If food preparation is not possible, suggest community resources, such as Meals-on-Wheels. Suggest picnics in the yard or inviting friends over for meals.
Loss of appetite and senses of smell and taste	Eat essential, nutrient-dense foods first; follow with desserts and low-nutrient-density foods. Review dietary restrictions, and find ways to make meals appealing within these guidelines. Eat small meals frequently instead of three large meals a day.
Limited income	Suggest using generic brands and coupons. Substitute milk, dairy products, and beans for meat. Avoid convenience foods if able to cook. Buy foods that are on sale and freeze for future use. Suggest community resources and nutrition programs.
Difficulty sleeping at night	Have the major meal at noon instead of in the evening. Avoid tea, coffee, or other stimulants in the evening.

CLIENT TEACHING

Nutrition for Older Adults

- *Include each food group on the Food Pyramid/MyPlate.* For example, a 65-year-old female of average height and weight who performs less than 30 minutes of exercise per day requires 1,600 Kcal consisting of the following:

Grains	5 ounces
Vegetables	2 cups
Fruits	1.5 cups
Milk, yogurt, and cheese	3 cups
Meat and beans	5 ounces

- *Reduce caloric intake.* Caloric needs generally decrease in older adults often because of decreased activity. Older adults need to consume nutrient-dense foods and avoid foods that are high in calories but have few nutrients.
- *Reduce fat consumption.* Use leaner cuts of meat, and limit portions to 4 to 6 oz per day. (But be sure intake of meat is sufficient, because older adults often consume inadequate amounts of these foods.) Broil, boil, or bake foods instead of frying them. Use low-fat milk and cheese; limit intake of butter, margarine, and salad dressings.
- *Reduce consumption of empty calories.* Substitute fruit or puddings made with low-fat milk in place of pastry, cookies, and rich desserts.
- *Reduce sodium consumption for clients who have hypertension or other cardiac problems.* Avoid canned soups, ketchup, and mustard. Avoid salted, smoked, cured, and pickled meats (e.g., ham and bacon), poultry, and fish. Do not add salt when cooking foods or at the table.
- *Ensure adequate calcium intake (at least 800 mg) to prevent bone loss.* Milk, cheese, yogurt, cream soups, puddings, and frozen milk products are good sources. Go to nursing.pearsonhighered.com to download the Nutritional Reference Guide and see the Major Food Sources of Calcium table.
- *Ensure adequate vitamin D intake.* Vitamin D is essential to maintain calcium homeostasis. Include some milk, because other dairy products are not usually fortified with vitamin D. If milk cannot be tolerated because of a lactose deficiency, provide vitamin supplements.
- *Ensure adequate iron intake.* Iron intake in older people may be compromised by such factors as increased incidence of GI disturbance, chronic diarrhea, regular aspirin use, and possible reduction in meat consumption. Go to nursing.pearsonhighered.com to download the Nutritional Reference Guide and see the Major Food Sources of Iron table.
- *Consume fiber-rich foods to prevent constipation and minimize use of laxatives.* Go to nursing.pearsonhighered.com to download the Nutritional Reference Guide and see the Fiber-Rich Foods table. Because fiber-rich foods provide bulk and a feeling of fullness, they help people control their appetites and lose weight.

LIFESPAN CONSIDERATIONS Nutrition

CHILDREN

- Children learn eating habits from their parents. It is the parents' responsibility to be good nutritional role models, both in terms of what they eat and how they incorporate food into their lifestyle.
- During the preschool and early school-age years, children learn lifelong eating habits. It is the parents' responsibility to provide the child with adequate amounts of nutritious foods in an environment that is relaxed and comfortable for eating. It is the child's responsibility to decide what and how much of the nutritious foods to eat. Parents should be counseled that eating can become a source of conflict if the parent tries to tell the child what and how much to eat, or if the child tries to tell the parent what foods should be eaten. Children's access to "junk food" should be limited, but completely forbidding a food may also create conflict.
- Adolescents who are vegan or vegetarians are at risk for some nutritional deficits.

LIFESPAN CONSIDERATIONS **Nutrition—*continued***

OLDER ADULTS

Most older adults take several medications. Considerations for potential problems include the following:

- Some foods interact adversely or decrease the effectiveness of certain medications, such as foods high in vitamin K and the anticoagulant warfarin (Coumadin). Older adults should not change their diet significantly without consulting the health care provider since drug dosage may have been based on the older adult's previous dietary intake.
- Some medications increase appetite, such as glucocorticoids.
- Some medications decrease appetite by their actions or by causing an unpleasant taste.
- Certain tablets should not be crushed to be given by mouth or by gastric tubes, such as enteric-coated or slow-release medications.

Conditions such as neuromuscular disorders and dementia can make it difficult for older adults to eat or to be fed. Safety should always be a priority concern with attention paid to prevent aspiration. All health care personnel and family caregivers should be taught proper techniques to reduce this risk. Effective techniques include:

- Use the chin-tuck method when feeding clients with dysphagia. Have them flex the head toward the chest when swallowing to decrease the risk of aspiration into the lungs.
- Use foods of prescribed consistency. Many older adults can swallow foods with thicker consistency more easily than thin liquids.
- Try to focus on food preferences—the family can help provide this information.
- Try to maintain mealtime as a positive social occasion with conversations and extra attention to having a pleasant environment.

Economic factors may influence older adults' nutritional status if they cannot afford food, especially if a prescribed diet requires expensive supplements. Inexpensive or convenience foods such as canned soups are often high in fat and sodium.

Dietary Guidelines for Americans

This guide is published by the USDA every 5 years, and the 2010 edition contains recommendations for the total diet that allows food choices that result in a nutrient-rich and calorie-balanced intake. Key points of the latest dietary guidelines follow:

- Shift to more plant-based foods such as vegetables, fruits, grains, beans, and nuts.
- Significantly reduce foods with added sugars and solid fats.
- Engage in regular physical activity.
- Consume foods, including milk products, each day that increase commonly insufficient nutrients: vitamin D, calcium, potassium, and fiber.
- Keep daily total fat intake within 20% to 35% of total calories, less than 7% from saturated fatty acids and less than 300 mg cholesterol. (See also Client Teaching for ways to reduce fat intake.)
- Consume less than 1,500 mg of sodium per day.
- If you drink alcohol, do so in moderation (one drink per day for women and two drinks per day for men).

These dietary recommendations are intended to help achieve the nutritional goals stated in *Healthy People 2020* (U.S. Department of Health and Human Services, 2013). Those goals include 22 specific nutritional objectives, such as the following:

- Reduce the incidence of obese adults (target = 30.5%) and children (target = 14.5%).
- Increase the proportion of persons ages 2 years and older who consume no more than 2,300 mg of sodium daily.
- Prevent inappropriate weight gain in youth and adults.
- Reduce consumption of calories from solid fats and added sugars in the population ages 2 years and older (target = 29.8%).

THE FOOD GUIDE PYRAMID AND MYPLATE

The Food Guide Pyramid is a graphic aid developed by the USDA as a guide in making daily food choices. On the pyramid, the food groups—grains, vegetables, fruits, milk, and meat and beans—are drawn from the base of the pyramid to the apex. This indicates that activity, moderation, personalization, proportionality, variety, and gradual improvement are the keys to good nutrition (Figure 47–1 ■).

CLIENT TEACHING

Reducing Dietary Fat

- Cook meat by grilling, baking, broiling, or microwaving rather than frying.
- Substitute popcorn or pretzels for such snacks as potato chips, cheese puffs, and corn chips.
- Read labels. Some crackers, for example, are high in fat; others are not.
- Limit desserts high in fat, such as candy, ice cream, cake, and cookies.
- Substitute hard candies for chocolate bars.
- Use skim or reduced-fat milk instead of whole milk, for drinking as well as in recipes.
- Use less butter or margarine on breads.
- Remove fat from meat and skin from chicken before cooking.
- Eat less meat; eat more fish.
- Use less dressing, or use low-fat dressings, on salads.
- Eat plant sources of protein (e.g., kidney, lima, and navy beans).
- Use nuts as a source of protein, but since they are high in fat, use to replace meat rather than in addition.

There are many variations of the standard food pyramid. Examples include the pyramid for young children, the Healthy Eating Pyramid from the Harvard School of Public Health, an Asian food pyramid, and a pyramid for older adults. Food guide pyramids or other shaped diagrams exist for many cultures, and Georgia State University has translated the original pyramid into more than 36 languages.

In May 2011, First Lady Michelle Obama introduced the MyPlate icon as a simpler reminder of how to implement the dietary guidelines. This depiction, and the website that accompanys it, promote getting more fruits and vegetables, whole grains, and low-fat dairy foods into the diet (Figure 47–2 ■). Although it may replace the pyramid in many settings, both diagrams are consistent with the *Dietary Guidelines*.

Using and following the guide does not guarantee that a person will consume the necessary levels of all essential nutrients. For example, someone who chooses cooked and low-fiber fruits and vegetables might not have an adequate intake of dietary fiber even though the recommended number of servings is eaten. However, the

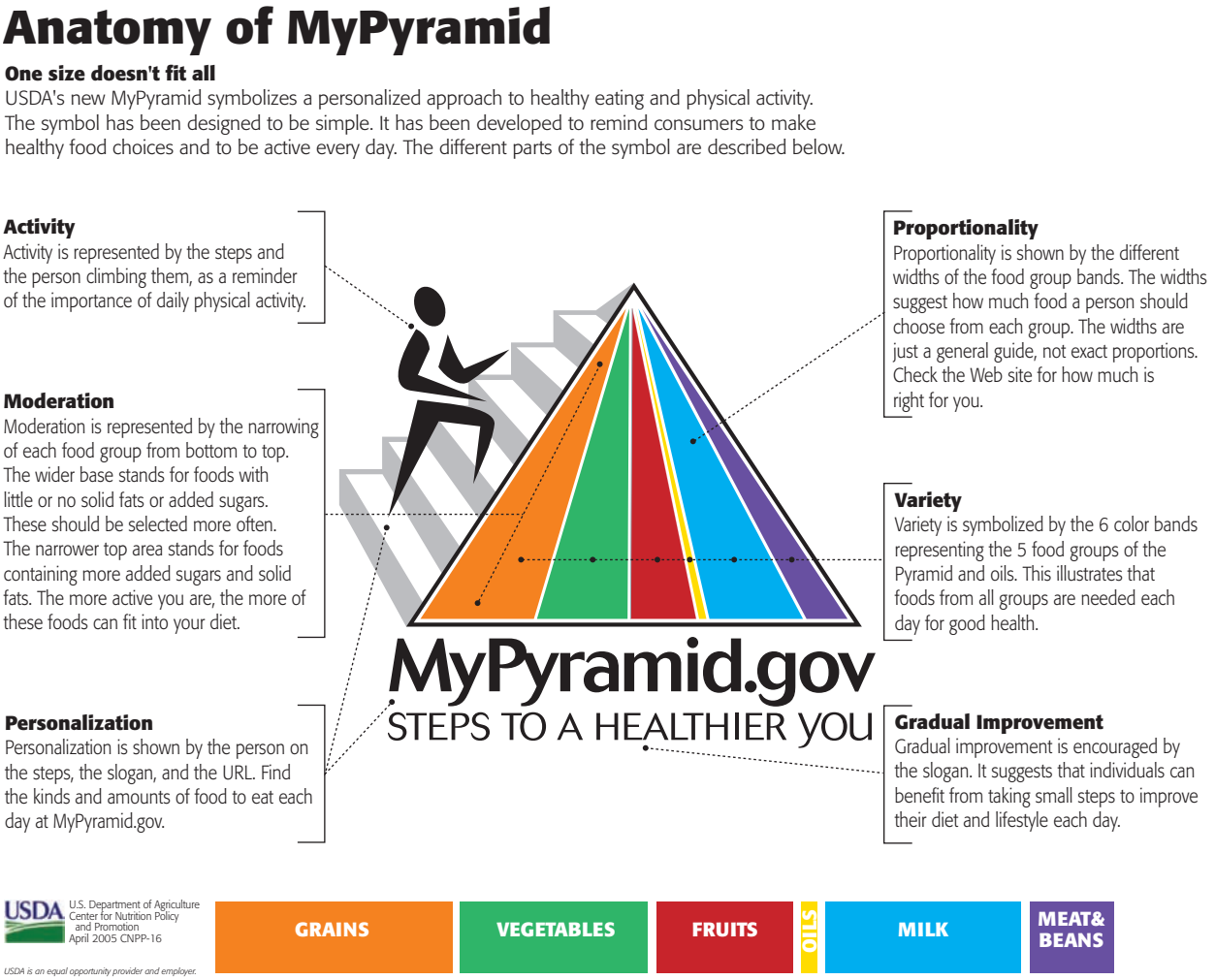


Figure 47–1 ■ The anatomy of the Food Guide Pyramid.
From U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2005.

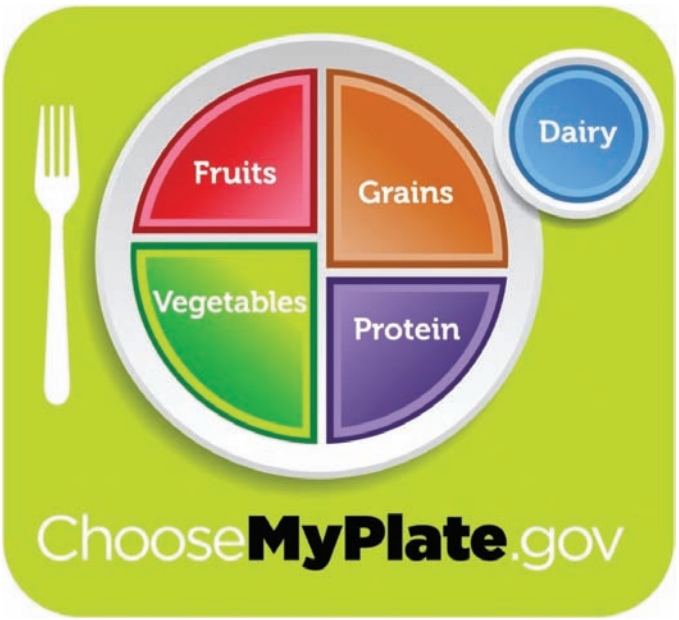


Figure 47–2 ■ MyPlate illustrates the five food groups using a familiar mealtime visual, a place setting.
From U.S. Department of Agriculture, 2013.

food guide is easy to follow, and people who eat a variety of foods from each group, in the suggested amounts, are likely to come close to recommended nutrient levels.

Recommended Dietary Intake

The Committee on the Scientific Evaluation of Dietary Reference Intakes of the Institute of Medicine publishes dietary reference intakes (DRIs) tables, which contain four sets of reference values: estimated average requirements (EARs), recommended dietary allowances (RDAs), adequate intakes (AIs), and tolerable upper intake levels (ULs). Definitions of these terms are found in Box 47–3. The values for RDAs and AIs in the tables are modified for different age groups and according to gender. The effect of illness or injury (increasing the need for nutrients) and the variability among individuals within any given subgroup are not taken into account in the DRIs.

Consumers most commonly learn recommended dietary intake information from the U.S. Food and Drug Administration (FDA) nutrition labels. Food labeling is required for most prepared foods, such as breads, cereals, canned and frozen foods, snacks, desserts, and drinks. Nutrition labeling for raw produce (fruits and vegetables) and fish is voluntary. Everyone must learn how to read and interpret these labels.

In Figure 47–3 ■, the section at the top of the label ❶ indicates serving size and number of servings in the container. The remaining

BOX 47–3 Definitions for Dietary Reference Value Tables

Dietary reference intakes (DRIs) are the standards for nutrient recommendations that include the following values:

- *Estimated average requirement (EAR):* the average daily nutrient intake value estimated to meet the requirement of half the healthy individuals in a particular life stage and gender group
- *Recommended dietary allowance (RDA):* the average daily nutrient intake level sufficient to meet the nutrient requirement of nearly all (97% to 98%) healthy individuals in a particular life stage and gender group
- *Adequate intake (AI):* used when RDA cannot be determined; a recommended average daily nutrient intake level based on observed or experimentally determined approximations or estimates of nutrient intake for a group (or groups) of healthy people that are assumed to be adequate
- *Tolerable upper intake level (UL):* the highest average daily nutrient intake level likely to pose no risk of adverse health effects to almost all individuals in a particular life stage and gender group. As intake increases above the UL, the potential risk of adverse health effects increases.

Source: *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids* (p. 3), by the National Academy of Sciences, 2005, Washington, DC: National Academies Press. Reprinted with permission. Retrieved from http://www.nal.usda.gov/fnic/DRI//DRI_Energy/energy_full_report.pdf

Sample label for Macaroni & Cheese

Nutrition Facts

1 Start Here

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving

2 Check Calories

Calories 250 Calories from Fat 110

	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

3 Limit these Nutrients

4 Get Enough of these Nutrients

6 Quick Guide to % DV

- 5% or less is Low
- 20% or more is High

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

5 Footnote

Figure 47–3 ■ The Nutrition Facts label.
From *How to Understand and Use the Nutrition Facts Label*, by the U.S. FDA/Center for Food Safety & Applied Nutrition, 2004. Retrieved from http://www.fda.gov/Food/IngredientsPackagingLabeling/LabelingNutrition/ucm274593.htm

information on the label indicates the values for *each serving.* If the person consumes a container that has more than one serving, the person must multiply the values to determine the real nutrient content. The next section ❷ indicates the number of total calories and calories from fat per serving. Based on a 2,000-calorie diet, a serving with 40 calories is considered low, 100 calories moderate, and 400 calories high. Section ❸ has those nutrients that should be minimized: fats, cholesterol, and sodium. A "% Daily Value" (DV) of 5% or less is low, and 20% or more is high. When adding the % DV from all foods eaten in one day, the goal is to keep the total below 100%. Packaged foods must list *trans*-fat content. *Trans*-fats are created when unsaturated oils are hydrogenated to create a solid form and are used in frying foods, margarine, and many snack products. They are also present in meat and dairy fats. *Trans*-fats have been shown to increase cholesterol and contribute to heart disease. The next section ❹ includes fiber, vitamins, and minerals commonly insufficient in American diets. When adding the percent values from all foods eaten in one day, the goal is for the total DV of each of these to be at least 100%. The footnote ❺ indicates the approximate DVs for fat cholesterol, sodium, total carbohydrate, and fiber for 2,000- and 2,500-calorie diets. The 2,000-calorie values are used for the % DV numbers in the upper sections ❻. Note that the % DV on this label has not yet been revised to reflect the 2010 dietary guidelines.

If the label on a food is missing, consumers can retrieve the information from several websites.

Vegetarian Diets

People may become vegetarians for economic, health, religious, ethical, or ecologic reasons. There are two basic vegetarian diets: those that use only plant foods (vegan) and those that include milk, eggs, or dairy products. Some people eat fish and poultry but not beef, lamb, or pork; others eat only fresh fruit, juices, and nuts; and still others eat plant foods and dairy products but not eggs. Go to nursing .pearsonhighered.com to download the Nutritional Reference Guide to see the Types of Vegetarian Diets table.

Vegetarian diets can be nutritionally sound if they include a wide variety of foods and if proper protein and vitamin and mineral supplementation are provided. Because the proteins found in plant foods are incomplete proteins, vegetarians must eat complementary protein foods to obtain all of the essential amino acids. A plant protein can be complemented by combining it with a different plant protein. The combination produces a complete protein (Box 47–4). Obtaining complete proteins is especially important for growing children and pregnant and lactating women, whose protein needs are high. Generally, legumes (starchy beans, peas, lentils) have complementary relationships with grains, nuts, and seeds. Complementary foods must be eaten in the same meal. Diets such as the fruitarian diet do not provide sufficient amounts of essential nutrients and are not recommended for long-term use.

Foods of animal origin are the best source of vitamin B_{12}. Therefore, vegans need to obtain this vitamin from other sources: brewer's yeast, foods fortified with vitamin B_{12}, or a vitamin supplement. Because iron from plant sources is not absorbed as efficiently as iron from meat, vegans should eat iron-rich foods (e.g., green leafy vegetables, whole grains, raisins, and molasses) and iron-enriched foods. They should eat a food rich in vitamin C at each meal to enhance iron absorption. Calcium deficiency is a concern only for strict vegetarians. It can be prevented by including in the diet soybean milk and tofu (soybean curd) fortified with calcium and leafy green vegetables.

BOX 47–4 Combinations of Plant Proteins That Provide Complete Proteins

Grains plus legumes = complete protein.
Legumes plus nuts or seeds = complete protein.
Grains, legumes, nuts, or seeds plus milk or milk products (e.g., cheese) = complete protein.

Grains	Legumes	Nuts and Seeds
Brown rice	Black beans	Almonds
Barley	Kidney beans	Brazil nuts
Corn meal	Lima beans	Cashews
Millet	Soybeans	Pecans
Oats/oatmeal	Lentils	Walnuts
Rye	Tofu	Pumpkin seeds
Whole wheat	Black-eyed peas	Sesame seeds
	Split peas	Sunflower seeds
Examples	Black-eyed peas and rice	
	Lentil soup and whole-wheat bread	
	Beans and tortillas	
	Lima beans and sesame seeds	
	Cereal with milk	
	Macaroni with cheese	

ALTERED NUTRITION

Malnutrition is commonly defined as the lack of necessary or appropriate food substances, but in practice includes both undernutrition and overnutrition. **Overnutrition** refers to a caloric intake in excess of daily energy requirements, resulting in storage of energy in the form of adipose tissue. As the amount of stored fat increases, the individual becomes overweight or obese. A person is said to be **overweight** when the BMI is between 25 and 29.9 kg/m^2 and **obese** when the BMI is >30 kg/m^2 (National Heart, Lung, and Blood Institute, n.d.).

Excess body weight increases the stress on body organs and predisposes people to chronic health problems such as hypertension and diabetes mellitus. Obesity that interferes with mobility or breathing is referred to as morbid obesity. Obese individuals may also manifest undernourishment in important nutrients (e.g., essential vitamins or minerals) even though excess calories are ingested.

Undernutrition refers to an intake of nutrients insufficient to meet daily energy requirements because of inadequate food intake or improper digestion and absorption of food. An inadequate food intake may be caused by the inability to acquire and prepare food, inadequate knowledge about essential nutrients and a balanced diet, discomfort during or after eating, dysphagia, anorexia, nausea, vomiting, and so on. Improper digestion and absorption of nutrients may be caused by an inadequate production of hormones or enzymes or by medical conditions resulting in inflammation or obstruction of the GI tract.

Inadequate nutrition is associated with marked weight loss, generalized weakness, altered functional abilities, delayed wound healing, increased susceptibility to infection, decreased immunocompetence, impaired pulmonary function, and prolonged length of hospitalization. In response to undernutrition, carbohydrate reserves, stored as

liver and muscle glycogen, are mobilized. However, these reserves can only meet energy requirements for a short time (e.g., 24 hours) and then body protein is mobilized.

Protein-calorie malnutrition (PCM), seen in starving children of underdeveloped countries, is now also recognized as a significant problem of clients with long-term deficiencies in caloric intake (e.g., those with cancer and chronic disease). Characteristics of PCM are depressed visceral proteins (e.g., albumin), weight loss, and visible muscle and fat wasting.

Protein stores in the body are generally divided into two compartments: somatic and visceral. Somatic protein consists largely of skeletal muscle mass; it is assessed most commonly by conducting anthropometric measurements such as the mid-arm circumference (MAC) and the mid-arm muscle area (MAMA). (See the *Anthropometric Measurements* section on page 1144.) Visceral protein includes plasma protein, hemoglobin, several clotting factors, hormones, and antibodies. It is usually assessed by measuring serum protein levels such as albumin and transferrin, discussed in the *Biochemical (Laboratory) Data* section of *Assessing*, which follows.

●○● NURSING MANAGEMENT

Assessing

A nutritional assessment identifies clients at risk for malnutrition and those with poor nutritional status. In most health care facilities, the responsibility for nutritional assessment and support is shared by the primary care provider, the dietitian, and the nurse. A comprehensive nutritional assessment is often performed by a nutritionist or a dietitian, and the primary care provider. Components of a nutritional assessment are shown in Table 47–3 and may be remembered as ABCD data: anthropometric, biochemical, clinical, and dietary.

Nutritional Screening

Because a comprehensive nutritional assessment is time consuming and expensive, various levels and types of assessment are available. Nurses perform a nutritional screen. A nutritional screen is an assessment performed to identify clients at risk for malnutrition or those who are malnourished. For clients who are found to be at moderate or high risk for malnutrition (Box 47–5), follow-up is provided in the

TABLE 47–3 Components of a Nutritional Assessment

	Screening Data	Additional In-Depth Data
Anthropometric data	• Height • Weight • Ideal body weight • Usual body weight • Body mass index	• Triceps skinfold (TSF) • Mid-arm circumference (MAC) • Mid-arm muscle area (MAMA)
Biochemical data	• Hemoglobin • Serum albumin • Total lymphocyte count	• Serum transferrin level • Urinary urea nitrogen • Urinary creatinine excretion
Clinical data	• Skin • Hair and nails • Mucous membranes • Activity level	• Hair analysis • Neurologic testing
Dietary data	• 24-hour food recall • Food frequency record	• Selective food frequency record • Food diary • Diet history

BOX 47–5 Summary of Risk Factors for Nutritional Problems

DIET HISTORY
- Chewing or swallowing difficulties (including ill-fitting dentures, dental caries, and missing teeth)
- Inadequate food budget
- Inadequate food intake
- Inadequate food preparation facilities
- Inadequate food storage facilities
- Intravenous fluids (other than total parenteral nutrition for 10 or more days)
- Living and eating alone
- Physical disabilities
- Restricted or fad diets

MEDICAL HISTORY
- Adolescent pregnancy or closely spaced pregnancies
- Alcohol or substance abuse
- Catabolic or hypermetabolic condition: burns, trauma
- Chronic illness: end-stage renal disease, liver disease, AIDS, pulmonary disease (e.g., COPD), cancer
- Fluid and electrolyte imbalance
- GI problems: anorexia, dysphagia, nausea, vomiting, diarrhea, constipation
- Neurologic or cognitive impairment
- Oral and GI surgery
- Unintentional weight loss or gain of 10% within 6 months

MEDICATION HISTORY*
- Antacids
- Antidepressants
- Antihypertensives
- Anti-inflammatory agents
- Antineoplastic agents
- Aspirin
- Digitalis
- Diuretics (thiazides)
- Laxatives
- Potassium chloride

*The potential effects of some medications on nutrition are shown in Table 47–1 on page 1134.

form of a comprehensive assessment by a dietitian. Medicare standards for nursing homes require that any resident who experiences unplanned or undesired weight loss of 5% or more in 1 month, 7.5% or more in 3 months, or 10% or more in 6 months receive a full nutritional assessment by a nurse.

Nurses carry out nutritional screens through routine nursing histories and physical examinations. Custom-designed screens for a particular population (e.g., older adults and pregnant women) and specific disorders (e.g., cardiac disease) are available.

Screening tools such as the Patient-Generated Subjective Global Assessment (PG-SGA; Figure 47–4 ■) and the Nutrition Screening Initiative (NSI) can be incorporated into the nursing history. The PG-SGA is a method of classifying clients as either well nourished, moderately malnourished, or severely malnourished based on a dietary history and physical examination. It was established primarily for use with cancer clients, but has been widely tested and is appropriate for both inpatient and outpatient clients with various diagnoses.

The NSI is an ongoing project of the American Academy of Family Physicians, the American Dietetic Association, the National Council on Aging, and other organizations to promote nutrition screening and improved nutritional care for older adults. The NSI estimates that approximately half of hospitalized, nursing home, and home care older adults are malnourished. The NSI screens older adults using a nutrition checklist that contains nine warning signs of conditions that can interfere with good nutrition (Box 47–6).

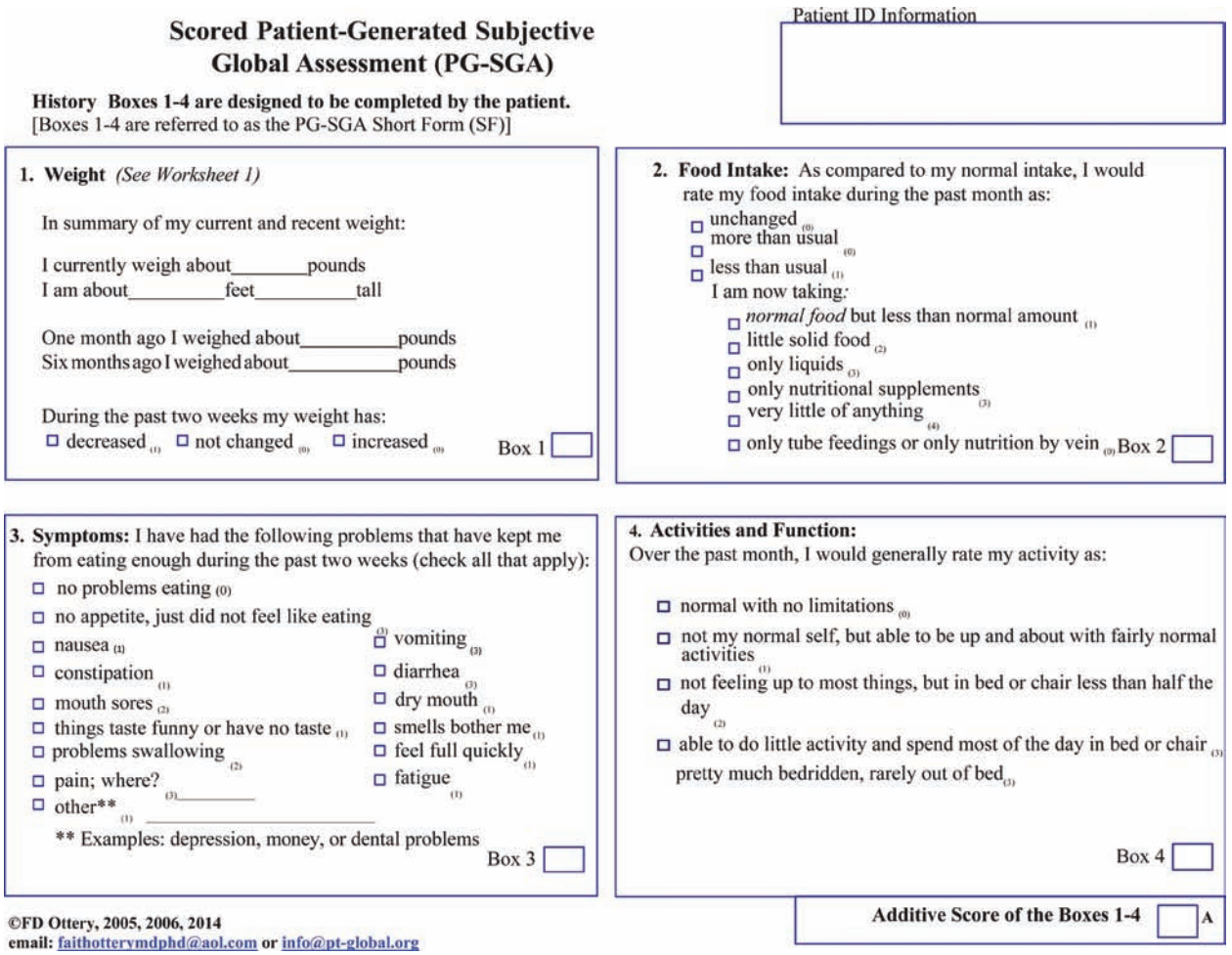
Nursing History

As mentioned earlier, nurses obtain considerable nutrition-related data in the routine admission nursing history. Data include but are not limited to the following:

- Age, sex, and activity level
- Difficulty eating (e.g., impaired chewing or swallowing)
- Condition of the mouth, teeth, and presence of dentures
- Changes in appetite
- Changes in weight
- Physical disabilities that affect purchasing, preparing, and eating
- Cultural and religious beliefs that affect food choices
- Living arrangements (e.g., living alone) and economic status
- General health status and medical condition
- Medication history.

Anthropometric Measurements

Anthropometric measurements are noninvasive techniques that aim to quantify body composition. A **skinfold measurement**



Scored Patient-Generated Subjective Global Assessment (PG-SGA)

Patient ID Information

History Boxes 1-4 are designed to be completed by the patient.
[Boxes 1-4 are referred to as the PG-SGA Short Form (SF)]

1. Weight *(See Worksheet 1)*

In summary of my current and recent weight:

I currently weigh about_____pounds
I am about_____feet_____tall

One month ago I weighed about_____pounds
Six months ago I weighed about_____pounds

During the past two weeks my weight has:
☐ decreased (1) ☐ not changed (0) ☐ increased (0) Box 1

2. Food Intake: As compared to my normal intake, I would rate my food intake during the past month as:
☐ unchanged (0)
☐ more than usual (0)
☐ less than usual (1)
I am now taking:
☐ *normal food* but less than normal amount (1)
☐ little solid food (2)
☐ only liquids (3)
☐ only nutritional supplements (3)
☐ very little of anything (4)
☐ only tube feedings or only nutrition by vein (0) Box 2

3. Symptoms: I have had the following problems that have kept me from eating enough during the past two weeks (check all that apply):
☐ no problems eating (0)
☐ no appetite, just did not feel like eating (3)
☐ nausea (1)
☐ vomiting (3)
☐ constipation (1)
☐ diarrhea (2)
☐ mouth sores (2)
☐ dry mouth (1)
☐ things taste funny or have no taste (1)
☐ smells bother me (1)
☐ problems swallowing (2)
☐ feel full quickly (1)
☐ pain; where? (3)_____
☐ fatigue (1)
☐ other** (1)_____
** Examples: depression, money, or dental problems
Box 3

4. Activities and Function:
Over the past month, I would generally rate my activity as:
☐ normal with no limitations (0)
☐ not my normal self, but able to be up and about with fairly normal activities (1)
☐ not feeling up to most things, but in bed or chair less than half the day (2)
☐ able to do little activity and spend most of the day in bed or chair (3) pretty much bedridden, rarely out of bed (3)
Box 4

Additive Score of the Boxes 1-4 A

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email: faithotterymdphd@aol.com or info@pt-global.org

Figure 47–4 ■ Scored Patient-Generated Subjective Global Assessment.
Faith D. Ottery, 2005, 2006, 2014 email: faithotterymdphd@aol.com or http://www.pt-global.org Reprinted with permission.

The remainder of this form is to be completed by your doctor, nurse, dietitian, or therapist. Thank you.

Scored Patient-Generated Subjective Global Assessment (PG-SGA)

Worksheet 1 - Scoring Weight (Wt) Loss

To determine score, use 1 month weight data if available. Use 6 month data only if there is no 1 month weight data. Use points below to score weight change and add one extra point if patient has lost weight during the past 2 weeks. Enter total point

Wt loss in 1 month	Points	Wt loss in 6 months
10% or greater	4	20% or greater
5-9.9%	3	10 -19.9%
3-4.9%	2	6 - 9.9%
2-2.9%	1	2 - 5.9%
0-1.9%	0	0 - 1.9%

Numerical score from Worksheet 1 ☐

Additive Score of the Boxes 1-4 (See Side 1) ☐ A

5. Worksheet 2 - Disease and its relation to nutritional requirements

All relevant diagnoses (specify) _____

Primary disease stage (circle if known or appropriate) I II III IV Other _____

One point each:

☐Cancer ☐AIDS ☐Pulmonary or cardiac cachexia ☐Presence of decubitus, open wound, or fistula

☐Presence of trauma ☐Age greater than 65 years ☐Chronic renal insufficiency

Numerical score from Worksheet 2 ☐ B

6. Work Sheet 3 - Metabolic Demand

Score for metabolic stress is determined by a number of variables known to increase protein & calorie needs. The score is additive so that a patient who has a fever of > 102 degrees (3 points) and is on 10 mg of prednisone chronically (2 points) would have an additive score for this section of 5 points.

Stress	none (0)	low (1)	moderate (2)	high (3)
Fever	no fever	>99 and <101	≥101 and <102	≥102
Fever duration	no fever	<72 hrs	72 hrs	> 72 hrs
Corticosteroids	no corticosteroids	low dose (<10mg prednisone equivalents/day)	moderate dose (≥10 and <30mg prednisone equivalents/day)	high dose steroid (≥ 30mg prednisone equivalents/day)

Numerical score from Worksheet 3 ☐ C

7. Worksheet 4 - Physical Exam

Physical exam includes a subjective evaluation of 3 aspects of body composition: fat, muscle, & fluid status. Since this is subjective, each aspect of the exam is rated for degree of deficit. Muscle deficit impacts point score more than fat deficit. Definition of categories: 0 = no deficit, 1+ = mild deficit, 2+ = moderate 3+ = severe

Muscle Status:				
clavicles (pectoralis & deltoids)	0	1+	2+	3+
interosseous muscles	0	1+	2+	3+
thigh (quadriceps)	0	1+	2+	3+
Global muscle status rating	**0**	**1+**	**2+**	**3+**
orbital fat pads	0	1+	2+	3+
triceps skin fold	0	1+	2+	3+
Global fat deficit rating	**0**	**1+**	**2**	**3+**

Fluid Status:				
sacral edema	0	1+	2+	3+
Global fluid status rating	**0**	**1+**	**2+**	**3+**

Numerical score from Worksheet 4 ☐ D

Total PG-SGA score ☐

(Total numerical score of A+B+C+D above)

(See triage recommendations below)

Global PG-SGA rating (A, B, or C) = ☐

Clinician Signature_____RD RN PA MD DO Other____ Date _____

Worksheet 5 - PG-SGA Global Assessment Categories

	Stage A	Stage B	Stage C
Category Weight	Well nourished No wt loss OR Recent wt gain	Moderately malnourished ≤5% wt loss in 1 month (or 10% in 6 mos) OR Progressive wt loss	Severely malnourished > 5% wt loss in 1 month (or >10% in 6 mos) OR Progressive wt loss
Nutrient intake	No deficit OR Significant recent improvement	Definite decrease in intake	Severe deficit in intake
Nutrition Impact Symptoms	None OR Significant recent improvement allowing adequate intake	Present of nutrition impact symptoms (PG-SGA Box 3)	Present of nutrition impact symptoms (PG-SGA Box 3)
Functioning	No deficit OR Recent improvement	Moderate functional deficit OR Recent deterioration	Severe functional deficit OR recent significant deterioration
Physical Exam	No deficit OR Chronic deficient but tissue, recent improvement	Evidence of mild to moderate loss of muscle mass / SQ fat / muscle tone on palpation	Obvious signs of malnutrition (e.g., severe loss muscle, SQ possible edema)

Nutritional Triage Recommendations: Additive score is used to define specific nutritional interventions including patient & family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, or parenteral triage).

First line nutrition intervention includes optimal symptom management.

Triage based on PG-SGA point score

0-1	No intervention required at this time. Re-assessment on routine and regular basis during treatment.
2-3	Patient & family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and lab values as appropriate.
4-8	Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms (Box 3).
≥ 9	Indicates a critical need for improved symptom management and/or nutrient intervention options.

Figure 47–4 ■ *Continued*

BOX 47–6 Nutritional Screening Tool

Read the statement. Circle the number in the Yes column for those that apply to you. Total your nutritional assessment.

If you scored 0–2: Good! Recheck your nutritional score in 6 months.

If you scored 3–5: You are at moderate nutritional risk. See what can be done to improve your eating habits and lifestyle. Recheck your score in 3 months.

If you scored 6 or above: You are at high nutritional risk. Take this checklist to your doctor, nurse practitioner, or home health nurse. Ask for help to improve your nutritional health.

Nutritional Assessment Statements	Yes
I have an illness or condition that made me change the kind or amount of food I eat.	2
I eat fewer than two meals per day.	3
I eat few fruits, vegetables, 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 do not 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, or feed myself.	2
Total	_____

From *Determine Your Nutritional Health,* by the Nutrition Screening Initiative, 2008, Washington, DC: National Council on Aging. Reprinted with permission by the Nutrition Screening Initiative, a project of the American Dietetic Association, funded in part by a grant from Ross Products Division, Abbott Laboratories, Inc.

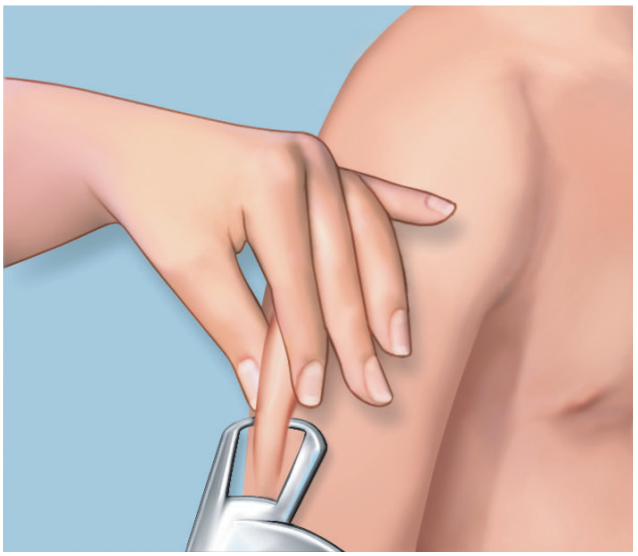


Figure 47–5 ■ Measuring the triceps skinfold.

Figure 47–6 ■ Measuring the mid-arm circumference.

is performed to determine fat stores. The most common site for measurement is the triceps skinfold (TSF). The fold of skin measured includes subcutaneous tissue but not the underlying muscle. It is measured in millimeters using special calipers. To measure the TSF, locate the midpoint of the upper arm (halfway between the acromion process and the olecranon process), then grasp the skin on the back of the upper arm along the long axis of the humerus (Figure 47–5 ■). Placing the calipers 1 cm (0.4 in.) below the nurse's fingers, measure the thickness of the fold to the nearest millimeter.

The **mid-arm circumference (MAC)** is a measure of fat, muscle, and skeleton. To measure the MAC, ask the client to sit or stand with the arm hanging freely and the forearm flexed to horizontal. Measure the circumference at the midpoint of the arm, recording the measurement in centimeters, to the nearest millimeter (e.g., 24.6 cm) (Figure 47–6 ■).

The **mid-arm muscle area (MAMA)** is then calculated by using reference tables or by using a formula that incorporates the TSF and the MAC. The MAMA is an estimate of lean body mass, or skeletal muscle reserves. If tables are not available, the nurse uses the following formula to calculate the MAMA from the triceps skinfold and MAC direct measurements:

$$\text{MAMA (cm}^2\text{)} = \frac{[\,\text{midarm circumference (cm)} - (3.14 \times \text{TSF cm})\,]^2}{4\pi} - 10 \text{ (males) or } -6.5 \text{ (females)}$$

TABLE 47–4 Standard Values for Anthropometric Measurements for Adults

Measurement	Male	Female
Triceps skinfold	12 mm	20 mm
Mid-arm circumference	32 cm	28 cm
Mid-arm muscle area	54 cm^2	30 cm^2

From "Overview of Undernutrition," in *The Merck Manual Online*, 2012, by R. S. Porter and J. L. Kaplan (Eds.). Retrieved from http://www.merckmanuals.com/professional/nutritional_disorders/undernutrition/overview_of_undernutrition.html.

Standard values for anthropometric measurements for adults are shown in Table 47–4.

Changes in anthropometric measurements occur slowly and reflect chronic rather than acute changes in nutritional status. They are used, therefore, to monitor the client's progress for months to years rather than days to weeks. Ideally, initial and subsequent measurements need to be taken by the same clinician. In addition, measurements obtained need to be interpreted with caution. Fluctuations in hydration status that often occur during illness can influence the accuracy of results. In addition, normal standards often do not account for normal changes in body composition such as those that occur with aging.

Biochemical (Laboratory) Data

Laboratory tests provide objective data to the nutritional assessment, but because many factors can influence these tests, no single test specifically predicts nutritional risk or measures the presence or degree of a nutritional problem. The tests most commonly used are serum proteins, urinary urea nitrogen and creatinine, and total lymphocyte count.

Serum Proteins

Serum protein levels provide an estimate of visceral protein stores. Tests commonly include hemoglobin, albumin, transferrin, and total iron-binding capacity. A low hemoglobin level may be evidence of iron deficiency anemia. However, abnormal blood loss or a pathologic process such as GI cancer must be ruled out before iron deficiency related to diet is confirmed.

Albumin, which accounts for over 50% of the total serum proteins, is one of the most common visceral proteins evaluated as part of the nutritional assessment. Because there is so much albumin in the body and because it is not broken down very quickly (i.e., it has a half-life of 18 to 20 days), albumin concentrations change slowly. A low serum albumin level is a useful indicator of prolonged protein depletion rather than acute or short-term

changes in nutritional status. However, many conditions besides malnutrition can depress albumin concentration, such as altered liver function, hydration status, and losses from open wounds and burns.

Transferrin binds and carries iron from the intestine through the serum. Because it has a shorter half-life than albumin (8 to 9 days), transferrin responds more quickly to protein depletion than albumin. Serum transferrin can be measured directly or by a total iron-binding capacity (TIBC) test, which indicates the amount of iron in the blood to which transferrin can bind. Transferrin levels below normal are found with protein loss, iron deficiency anemia, pregnancy, hepatitis, or liver dysfunction.

Prealbumin, also referred to as thyroxine-binding albumin or transthyretin, has the shortest half-life and smallest body pool and is, therefore, the most responsive serum protein to rapid changes in nutritional status. Prealbumin levels of 15 to 35 mg/dL are normal, below 15 indicates clients at risk, and below 11 indicates that aggressive nutritional intervention is needed.

Urinary Tests

Urinary urea nitrogen and urinary creatinine are measures of protein catabolism and the state of nitrogen balance. **Urea**, the chief end product of amino acid metabolism, is formed from ammonia detoxified by the liver, circulated in the blood, and transported to the kidneys for excretion in urine. Urea concentrations in the blood and urine, therefore, directly reflect the intake and breakdown of dietary protein, the rate of urea production in the liver, and the rate of urea removal by the kidneys.

The state of nitrogen balance is determined by comparing the nitrogen intake (grams of protein) to the nitrogen output over a 24-hour period. A positive nitrogen balance exists when intake exceeds nitrogen output; a negative nitrogen balance occurs when output exceeds nitrogen intake. Protein intake must be accurately recorded and kidney function must be normal to ensure the validity of a urinary urea nitrogen test.

Urinary creatinine reflects a person's total muscle mass because creatinine is the chief end product of the creatine produced when energy is released during skeletal muscle metabolism. The rate of creatinine formation is directly proportional to the total muscle mass. Creatinine is removed from the bloodstream by the kidneys and excreted in the urine at a rate that closely parallels its formation. The greater the muscle mass, the greater the excretion of creatinine. As skeletal muscle atrophies during malnutrition, creatinine excretion decreases. Urinary creatinine is influenced by protein intake, exercise, age, sex, height, renal function, and thyroid function.

Total Lymphocyte Count

Certain nutrient deficiencies and forms of PCM can depress the immune system. The total number of lymphocyte white blood cells decreases as protein depletion occurs.

Clinical Data (Physical Examination)

Physical examination reveals some nutritional deficiencies and excesses besides obvious weight changes. Assessment focuses on rapidly proliferating tissues such as skin, hair, nails, eyes, and mucosa but also includes a systematic review comparable to any routine physical examination. See Clinical Manifestations and Figure 47–7 ■ for signs associated with malnutrition. These signs must be viewed as suggestive of malnutrition because the signs are nonspecific. For example, red conjunctiva may indicate an infection rather than a nutritional deficit, and dry, dull hair may be related to excessive exposure to the sun rather than severe protein-energy malnutrition. To confirm malnutrition, clinical findings need to be substantiated with laboratory tests and dietary data.

Calculating Percentage of Weight Loss

Accurate assessment of the client's height, current body weight (CBW), and usual body weight (UBW) is essential. Although the client's CBW can be compared with an ideal body weight discussed earlier, the IBW is based on healthy people and does not account for changes in the client's body composition that accompany illness or reflect any changes in weight. The client's UBW better indicates weight change and the possibility of malnutrition. Calculation and interpretation of the percentage of deviation from UBW and the percentage of weight loss are shown in Box 47–7. An important aspect of weight assessment, obtained during the nursing history, is a description of weight change. The nurse should document any weight loss or gain, the duration of the change, and whether the weight change was intentional or unintentional.

Dietary Data

Dietary data includes the client's usual eating patterns and habits; food preferences, allergies, and intolerances; frequency, types, and quantities of foods consumed; and social, economic, ethnic, or religious factors influencing nutrition. Factors may include, but are not limited to, living and eating companions, ability to purchase and prepare food, availability of refrigeration and cooking facilities, income, and effect of religion and ethnicity on food choices.

Four possible methods for collecting dietary data are a 24-hour food recall, a food frequency record, a food diary, and a diet history.

For a **24-hour food recall**, the nurse asks the client to recall all of the food and beverages the client consumes during a typical 24-hour period when at home. The data obtained are then generally evaluated according to the Food Guide to judge overall adequacy.

A **food frequency record** is a checklist that indicates how often general food groups or specific foods are eaten. Frequency may be categorized as times/day, times/week, times/month, or frequently, seldom, never. This record provides information about the types of foods eaten but not the quantities. When specific foods or nutrients are suspected of being deficient or excessive, the health care professional may use a selective food frequency that focuses, for example, on fat, fruit, vegetable, or fiber intake.

A **food diary** is a detailed record of measured amounts (portion sizes) of all food and fluids a client consumes during a specified period, usually 3 to 7 days.

A **diet history** is a comprehensive time-consuming assessment of a client's food intake that involves an extensive interview by a nutritionist or dietitian. It includes characteristics of foods usually eaten and the frequency and amount of food consumed. It may include a 24-hour recall, a food frequency record, and a food diary. Medical and psychosocial factors are also assessed to evaluate their impact on

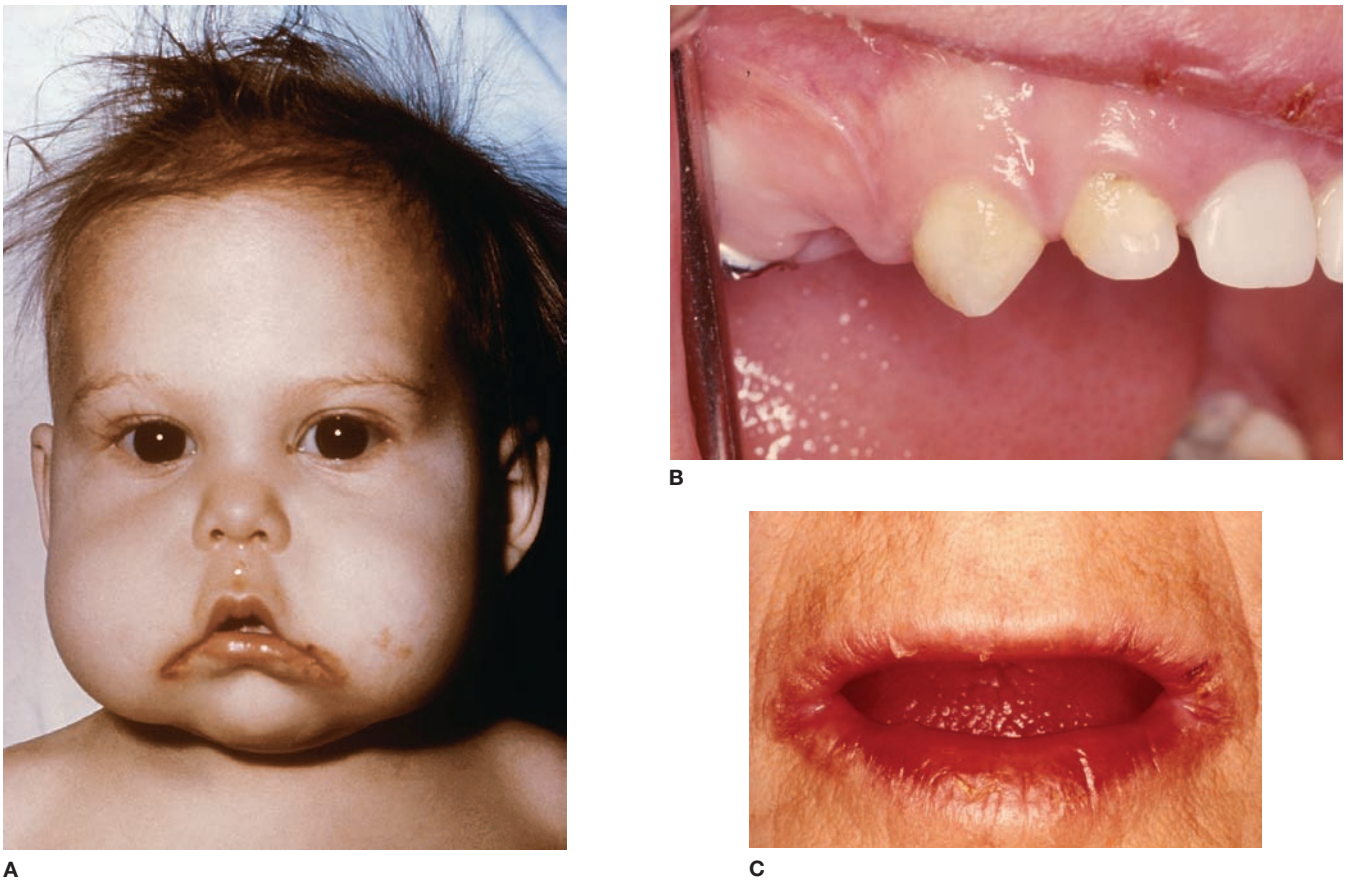


Figure 47–7 ■ Examples of nutritional deficiencies: *A,* dull, sparse hair and inflammation of the corners of the mouth from protein deficiency; *B,* rickets from vitamin D or calcium deficiency; *C,* pallagra, caused by a chronic lack of niacin (vitamin B).
A from Centers for Disease Control and Prevention; *B* from Custom Medical Stock Photo; C from Biophoto Associates/Science Source.

nutritional requirements, food habits, and choices. Data obtained are analyzed by computer and translated into caloric and nutrient intake. Results are compared with the DRIs appropriate for the client's age, sex, and condition.

Diagnosing

NANDA International (Herdman & Kamitsuru, 2014) includes the following diagnostic labels for nutritional problems:

- *Imbalanced Nutrition: Less Than Body Requirements*
- *Obesity*
- *Overweight*
- *Readiness for Enhanced Nutrition*

Many other NANDA nursing diagnoses may apply to certain individuals, because nutritional problems often affect other areas of human functioning. In this case, the nutritional diagnostic label may be used as the etiology of other diagnoses. Examples include:

- ***Activity Intolerance*** related to inadequate intake of iron-rich foods resulting in iron deficiency anemia
- ***Constipation*** related to inadequate fluid intake and fiber intake
- ***Chronic Low Self-Esteem*** related to obesity
- ***Risk for Infection*** related to immunosuppression secondary to insufficient protein intake.

Planning

Major goals for clients with or at risk for nutritional problems include the following:

- Maintain or restore optimal nutritional status.
- Promote healthy nutritional practices.
- Prevent complications associated with malnutrition.
- Decrease weight.
- Regain specified weight.

Specific nursing activities associated with each of these goals can be selected to meet the individual needs of the client. See the Nursing Care Plan and Concept Map at the end of this chapter.

Planning for Home Care

To provide for continuity of care, the nurse must consider the client's need for assistance with nutrition. Some clients will need help with eating, purchasing food, and preparing meals; others will need instructions about nutrition therapy.

CLINICAL MANIFESTATIONS

Malnutrition

Area of Examination (Possible Cause)	Signs Associated with Malnutrition
General appearance and vitality	Apathetic, listless, looks tired, easily fatigued
Weight	Overweight or underweight
Skin	Dry, flaky, or scaly; pale or pigmented; presence of petechiae or bruises; lack of subcutaneous fat; edema
Nails	Brittle, pale, ridged, or spoon shaped (iron)
Hair	Dry, dull, sparse, loss of color, brittle (Figure 47–7*A*)
Eyes	Pale or red conjunctiva, dryness, soft cornea, dull cornea, night blindness (vitamin A deficiency)
Lips	Swollen, red cracks at side of mouth, vertical fissures (B vitamins) (Figure 47–7*C*)
Tongue	Swollen, beefy red or magenta colored (B vitamins); smooth appearance (B vitamins deficiency); decrease or increase in size
Gums	Spongy, swollen, inflamed; bleed easily (vitamin C deficiency)
Muscles	Underdeveloped, flaccid, wasted, soft
GI system	Anorexia, indigestion, diarrhea, constipation, enlarged liver, protruding abdomen
Nervous system	Decreased reflexes, sensory loss, burning and tingling of hands and feet (B vitamins), mental confusion or irritability

Home care planning incorporates an assessment of the client's and family's abilities for self-care, financial resources, and the need for referrals and home health services. The Home Care Assessment box covers nutritional problems and needs. A major aspect of discharge planning involves the instructional needs of the client and family (see Client Teaching).

Implementing

Nursing interventions to promote optimal nutrition for hospitalized clients are often provided in collaboration with the primary care provider who writes the diet orders and the dietitian who informs clients about special diets. The nurse reinforces this instruction and, in addition, creates an atmosphere that encourages eating, provides assistance with eating, monitors the client's appetite and food intake, administers enteral and parenteral feedings, and consults with the primary care provider and dietitian about nutritional problems that arise.

In the community setting, the nurse's role is largely educational. Nurses promote optimal nutrition at health fairs, in schools, at prenatal classes, and with well or ill clients and support people in their homes. In the home setting, nurses also initiate nutritional screens, refer clients at risk to appropriate resources, instruct clients about enteral and parenteral feedings, and offer nutrition counseling as needed. Nutrition counseling involves more than providing information. The nurse must help clients integrate diet changes into their lifestyle and provide strategies to motivate them to change their eating habits.

All dietary instructions must be individually designed to meet the client's intellectual ability, motivation level, lifestyle, culture, and economic status. Both nutritionists and dietitians help to adapt a diet to suit the client. Simple verbal instructions need to be given and reinforced with written material. Family and support persons must be included in the dietary instruction.

Assisting with Special Diets

Alterations in the client's diet are often needed to treat a disease process such as diabetes mellitus, to prepare for a special examination or surgery, to increase or decrease weight, to restore nutritional deficits, or to allow an organ to rest and promote healing. Diets are modified in one or more of the following aspects: texture, kilocalories, specific nutrients, seasonings, or consistency.

Hospitalized clients who do not have special needs eat the regular (standard or house) diet, a balanced diet that supplies the metabolic requirements of a sedentary person (about 2,000 Kcal). Most agencies offer clients a daily menu from which to select their meals for the next day; others provide standard meals to each client on the general diet.

BOX 47–7 Calculating and Interpreting the Percentage of Deviation from Usual Body Weight and the Percentage of Weight Loss

CALCULATING PERCENTAGE OF USUAL BODY WEIGHT

$$\%\ \text{Usual body weight} = \frac{\text{current weight}}{\text{usual body weight}} \times 100$$

Mild malnutrition	85–90%
Moderate malnutrition	75–84%
Severe malnutrition	Less than 74%

CALCULATING PERCENTAGE OF WEIGHT LOSS

$$\%\ \text{Weight loss} = \frac{\text{usual weight} - \text{current weight}}{\text{usual weight}} \times 100$$

Significant Weight Loss	Severe Weight Loss
5% over 1 mo	Greater than 5% over 1 mo
7.5% over 3 mo	Greater than 7.5% over 3 mo
10% over 6 mo	Greater than 10% over 6 mo

Home Care Assessment Nutrition

PATIENT-CENTERED CARE

CLIENT/ENVIRONMENT

- *Self-care abilities:* Assess ability to feed self, to purchase food, and to prepare meals.
- *Adaptive feeding aids required:* Determine need for special drinking cups, plates, or feeding utensils.
- *Instructional needs:* Consider nutritional requirements (e.g., Food Guide Pyramid/MyPlate, dietary guidelines, special diet), adaptive aids available, recommended lifestyle variations, and management of enteral/parenteral nutrition.
- *Physical environment:* Assess adequacy of water, electricity, refrigeration, and telephone facilities; and presence of clean, secure area to store and set up enteral/parenteral equipment as needed.

FAMILY

- *Caregiver availability, skills, and willingness:* Assess whether primary and secondary individuals are able to assist with food purchase, meal preparation, and feeding and able to comprehend and administer special diets or enteral/parenteral nutrition required.
- *Family role changes and coping:* Consider effect on parenting and spousal roles, financial resources, and social roles.
- *Alternate potential primary or respite caregivers:* Consider the availability of other caregivers, for example, other family members, volunteers, church members, paid caregivers, or housekeeping services; available community respite care (adult day care, senior centers) and so on.

COMMUNITY

- *Current knowledge, use, and experience with community resources:* Review nutritional counseling services; home health agencies for enteral/parenteral nutrition support; dietitian or nutritionist for planning appropriate meals for prescribed diet, ways to include ethnic food preferences into the diet, and providing written meal plans; medical equipment and supply companies; financial assistance services; and support and educational services such as:
  - Weight management programs (e.g., Weight Watchers)
  - American Dietetic Association for information on all nutrition topics
  - National Eating Disorders Association
  - Meals-on-Wheels.

CLIENT TEACHING

Healthy Nutrition

- Instruct clients about the content of a healthy diet based on the Food Guide Pyramid/MyPlate and *Dietary Guidelines for Americans*
- Encourage clients, particularly older clients, to reduce dietary fat (see Client Teaching on reducing dietary fat, page 1139).
- Instruct strict vegetarians about proper protein complementation and additional vitamin and mineral supplementation.
- Discuss foods high in specific nutrients required such as protein, iron, calcium, vitamin C, and fiber.
- Discuss importance of properly fitted dentures and dental care.
- Discuss safe food preparation and preservation techniques as appropriate.

DIETARY ALTERATIONS

- Explain the purpose of the diet.
- Discuss allowed and excluded foods.
- Explain the importance of reading food labels when selecting packaged foods.
- Include family or significant others.
- Reinforce information provided by the dietitian or nutritionist as appropriate.
- Discuss herbs and spices as alternatives to salt and substitutes for sugar.

FOR CLIENTS WHO ARE OVERWEIGHT

- Discuss physiological, psychological, and lifestyle factors that predispose to weight gain.
- Provide information about desired weight range and recommended calorie intake.
- Discuss principles of a well-balanced diet and high- and low-calorie foods.
- Encourage intake of low-calorie, caffeine-free beverages, and plenty of water.
- Discuss ways to adapt eating practices by using smaller plates, taking smaller servings, chewing each bite a specified number of times, and putting fork down between bites.
- Discuss ways to control the desire to eat by taking a walk, drinking a glass of water, or doing slow deep-breathing exercises.
- Discuss the importance of exercise and help the client plan an exercise program.
- Discuss stress reduction techniques.
- Provide information about available community resources (e.g., weight-loss groups, dietary counseling, exercise programs, self-help groups).

FOR CLIENTS WHO ARE UNDERWEIGHT

- Discuss factors contributing to inadequate nutrition and weight loss.
- Discuss recommended calorie intake and desired weight range.
- Provide information about the content of a balanced diet.
- Provide information about ways to increase calorie intake (e.g., high-protein or high-calorie foods and supplements).
- Discuss ways to manage, minimize, or alter the factors contributing to malnourishment.
- If appropriate, discuss ways to purchase low-cost nutritious foods.
- Provide information about community agencies that can assist in providing food (e.g., Meals-on-Wheels).

PREVENTING FOODBORNE ILLNESS

- Reinforce hygienic handling of food and dishes:
  - Wash hands before preparing foods.
  - Wash hands and all dishes, utensils, and cutting boards with hot water and soap after contact with raw meats.
  - Defrost frozen foods in the refrigerator.
  - Cook beef, poultry, and eggs thoroughly. Use a cooking thermometer.
  - Refrigerate leftovers promptly (at 40°F [5°C] or less) and keep no more than 3 to 5 days.
  - Wash or peel raw fruits and vegetables.
  - Do not use foods from containers that have been damaged or have opened seals.
  - Follow the rules "keep hot foods hot and cold foods cold" and "when in doubt, throw it out."
- Recommend the client consider a preventive vaccination for hepatitis A.
- Instruct clients to seek medical attention for prolonged vomiting, fever, abdominal pain, or severe diarrhea following a meal.

A variation of the regular diet is the light diet, designed for postoperative and other clients who are not ready for the regular diet. Foods in the light diet are plainly cooked and fat is usually minimized, as are bran and foods containing a great deal of fiber.

Diets modified in consistency are often given to clients before and after surgery or procedures or to promote healing in clients with GI distress. These diets include clear liquid, full liquid, soft, and diet as tolerated. In some agencies, GI surgery clients are not permitted red-colored liquids or candy since, if vomited, the color may be confused with blood.

Clear Liquid Diet

This diet is limited to water, tea, coffee, clear broths, ginger ale, or other carbonated beverages, strained and clear juices, and plain gelatin. Note that "clear" does not necessarily mean "colorless." This diet provides the client with fluid and carbohydrate (in the form of sugar), but does not supply adequate protein, fat, vitamins, minerals, or calories. It is a short-term diet (24 to 36 hours) provided for clients after certain surgeries or in the acute stages of infection, particularly of the GI tract. The major objectives of this diet are to relieve thirst, prevent dehydration, and minimize stimulation of the GI tract. Examples of foods allowed in clear liquid diets are shown in Box 47–8.

Full Liquid Diet

This diet contains only liquids or foods that turn to liquid at body temperature, such as ice cream (see Box 47–8). Full liquid diets are often eaten by clients who have GI disturbances or cannot tolerate solid or semisolid foods. This diet is not recommended for long-term use because it is low in iron, protein, and calories. In addition, its cholesterol content may be high because of the amount of cow's milk offered. Clients who must receive only liquids for long periods are usually given a nutritionally balanced oral supplement, such as Ensure or Sustacal. The full liquid diet is monotonous and difficult for clients to accept. Planning six or more feedings per day may encourage a more adequate intake.

Soft Diet

The soft diet is easily chewed and digested. It is often ordered for clients who have difficulty chewing and swallowing. It is a low-residue (low-fiber) diet containing very few uncooked foods; however, restrictions vary among agencies and according to individual tolerance. Examples of foods that can be included in a soft or semisoft diet are shown in Box 47–8. The **pureed diet** is a modification of the soft diet. Liquid may be added to the food, which is then blended to a semisolid consistency.

Diet as Tolerated

"Diet as tolerated" is ordered when the client's appetite, ability to eat, and tolerance for certain foods may change. For example, on the first postoperative day a client may be given a clear liquid diet. If no nausea occurs, normal intestinal motility has returned as evidenced by active bowel sounds and client reports passing gas, and the client feels like eating, the diet may be advanced to a full liquid, light, or regular diet.

Modification for Disease

Many special diets may be prescribed to meet requirements for disease processes or altered metabolism. For example, a client with diabetes mellitus may need a diet recommended by the American Diabetes Association, an obese client may need a calorie-restricted diet, a cardiac client may need sodium and cholesterol restrictions, and a client with allergies will need a hypoallergenic diet.

Some clients must follow certain diets (e.g., the diabetic diet) for a lifetime. If the diet is long term, the client must understand the diet and also develop a healthy, positive attitude toward it. Assisting clients and support persons with special diets is a function shared by the dietitian or nutritionist and the nurse. The dietitian informs the client and support persons about the specific foods allowed and not allowed and assists the client with meal planning. The nurse reinforces this instruction, assists the client to make changes, and evaluates the client's responses.

Dysphagia

Some clients may have no difficulty with choosing a healthy diet, but be at risk for nutritional problems due to dysphagia. These clients may have inadequate solid or fluid intake, be unable to swallow their medications, or aspirate food or fluids into the lungs—causing pneumonia. Clients at risk for dysphagia include older adults, those who have experienced a stroke, clients with cancer who have

BOX 47–8 Examples of Foods for Clear Liquid, Full Liquid, and Soft Diets

Clear Liquid	Full Liquid	Soft
Coffee, regular and decaffeinated	All foods on clear liquid diet plus:	All foods on clear and full liquid diets, plus:
Tea	Milk and milk drinks	Meat: all lean, tender meat, fish, or poultry (chopped, shredded); spaghetti sauce with ground meat over pasta
Carbonated beverages	Puddings, custards	Meat alternatives: scrambled eggs, omelet, poached eggs; cottage cheese and other mild cheese
Bouillon, fat-free broth	Ice cream, sherbet	Vegetables: mashed potatoes, sweet potatoes, or squash; vegetables in cream or cheese sauce; other cooked vegetables as tolerated (e.g., spinach, cauliflower, asparagus tips), chopped and mashed as needed; avocado
Clear fruit juices (apple, cranberry, grape)	Vegetable juices	Fruits: cooked or canned fruits; bananas, grapefruit and orange sections without membranes, applesauce
Other fruit juices, strained	Refined or strained cereals (e.g., cream of rice)	Breads and cereals: enriched rice, barley, pasta; all breads; cooked cereals (e.g., oatmeal)
Popsicles	Cream, butter, margarine	Desserts: soft cake, bread pudding
Gelatin	Eggs (in custard and pudding)	
Sugar, honey	Smooth peanut butter	
Hard candy	Yogurt	

had radiation therapy to the head and neck, and others with cranial nerve dysfunction. Consider dysphagia if the client exhibits the following behaviors: coughs, chokes, or gags while eating; complains of pain when swallowing; has a gurgling voice; requires frequent oral suctioning.

Nurses may be the first persons to detect dysphagia and are in an excellent position to recommend further evaluation; implement specialized feeding techniques and diets; and work with clients, family members, and other health care professionals to develop a plan to assist the client with difficulties. If the client condition suggests dysphagia, the nurse should review the history in detail; interview the client or family; assess the mouth, throat, and chest; and observe the client swallowing. Although absence of or a reduced gag reflex indicates the client will have difficulty swallowing, the presence of the gag reflex should not be interpreted to indicate that swallowing will not be impaired.

A multidisciplinary group has developed the National Dysphagia Diet (NDD), which delineates standards of food textures (American Dietetic Association, 2002). The four levels of liquid foods are thin, nectar-like, honey-like, and spoon-thick liquids. The four levels of semisolid/solid foods are pureed, mechanically altered, advanced/mechanically soft, and regular/general. In consultation with the dietitian, occupational therapist, swallowing specialist, speech-language pathologist, and/or primary care provider, these levels can be used to determine a consistent approach to a particular client's dysphagia. For example, a mechanically soft diet may result in lower pneumonia rates than a pureed diet in clients who have had a stroke and a history of aspiration pneumonia. Early detection and intervention can prevent the adverse outcomes of dysphagia in most clients.

Stimulating the Appetite

Physical illness, unfamiliar or unpalatable food, environmental and psychological factors, and physical discomfort or pain may depress the appetites of many clients. A short-term decrease in food intake usually is not a problem for adults; over time, however, it leads to weight loss, decreased strength and stamina, and other nutritional problems. Decreased food intake is often accompanied by a decrease in fluid intake, which may cause fluid and electrolyte problems. Stimulating a person's appetite requires the nurse to determine the reason for the lack of appetite and then deal with the problem. Some general interventions for improving the client's appetite are summarized in Box 47–9.

BOX 47–9 Improving Appetite

- Provide familiar food that the person likes. Often the relatives of clients are pleased to bring food from home but may need some guidance about special diet requirements.
- Select small portions so as not to discourage the client.
- Avoid unpleasant or uncomfortable treatments immediately before or after a meal.
- Provide a tidy, clean environment that is free of unpleasant sights and odors. A soiled dressing, a used bedpan, an uncovered irrigation set, or even used dishes can negatively affect the appetite.
- Encourage or provide oral hygiene before mealtime. This improves the client's ability to taste.
- Relieve illness symptoms that depress appetite before mealtime; for example, give an analgesic for pain or an antipyretic for a fever or allow rest for fatigue.
- Reduce psychological stress. A lack of understanding of therapy, the anticipation of an operation, and fear of the unknown can cause anorexia. Often, the nurse can help by discussing feelings with the client, giving information and assistance, and allaying fears.

Assisting Clients with Meals

Because clients in health care agencies are frequently confined to their beds, meals are brought to the client. The client receives a tray that has been assembled in a central kitchen. Nursing personnel may be responsible for giving out and collecting the trays; however, in most settings this is done by dietary personnel. Long-term care facilities and some hospitals serve meals to mobile clients in a special dining area. Guidelines for providing meals to clients are summarized in Box 47–10.

Individuals who frequently require help with their meals include older adults who are weakened, individuals with disabilities such as visual impairment, those who must remain in a back-lying position, or those who cannot use their hands. The client's nursing care plan will indicate that assistance is required with meals.

The nurse must be sensitive to clients' feelings of embarrassment, resentment, and loss of autonomy. Whenever possible, the nurse should help clients feed themselves rather than feed them. Some clients become depressed because they require help and because they believe they are burdensome to busy nursing personnel. Although feeding a client is time consuming, nurses should try to appear unhurried and convey that they have ample time. Sitting at the bedside is one way to convey this impression. If the client is to be fed by unlicensed assistive personnel, the nurse must ensure that the same standards are met.

When feeding a client, ask in which order the client would like to eat the food. If the client cannot see, tell the client which food is being given. Always allow ample time for the client to chew and swallow the food before offering more. Also, provide fluids as requested or, if the client cannot communicate, offer fluids after every three or four mouthfuls of solid food. Make the time a pleasant one, choosing topics of conversation that are of interest to clients who want to talk.

Although normal utensils should be used whenever possible, special utensils may be needed to assist a client to eat. For clients who have difficulty drinking from a cup or glass, a straw often permits them to obtain liquids with less effort and less spillage. Special drinking cups are also available. One model has a spout; another is specially designed to permit drinking with less tipping of the cup than is normally required.

Many adaptive feeding aids are available to help clients maintain independence. A standard eating utensil with a built-up or widened handle helps clients who cannot grasp objects easily. Utensils with wide handles can be purchased, or a regular eating utensil can be modified by taping foam around the handle. The foam increases friction and steadies the client's grasp. Handles may be bent or angled to compensate for limited motion. Collars or bands that prevent the utensil from being dropped can be attached to the end of the handle

BOX 47–10 Providing Client Meals

- Offer the client assistance with hand washing and oral hygiene before a meal.
- If it is permitted, assist the client to a comfortable position in bed or in a chair, whichever is appropriate.
- Clear the overbed table so there is space for the tray. If the client must remain in a lying position in bed, arrange the overbed table close to the bedside so the client can see and reach the food.
- Check each tray for the client's name, the type of diet, and completeness. Do not leave an incorrect diet for a client to eat.
- Assist the client as required (e.g., remove the food covers, butter the bread, pour the tea, and cut the meat).
- For a client with a visual impairment, identify the placement of the food as you would describe the time on a clock (Figure 47–8 ■). For instance, the nurse might say, "The potatoes are at eight o'clock, the chicken at 12 o'clock, and the green beans at 4 o'clock."
- After the client has completed the meal, observe how much and what the client has eaten and the amount of fluid taken. Use a standard tool to estimate the amount eaten in relation to a typical meal. For example, if served a donut and hot chocolate for breakfast, although the client may have eaten both of these, they certainly do not represent 100% of a nutritious breakfast.
- If the client is on a special diet or is having problems eating, record the amount of food eaten and any pain, fatigue, or nausea experienced.
- If the client is not eating, document this so that changes can be made, such as rescheduling the meals, providing smaller, more frequent meals, or obtaining special self-feeding aids.

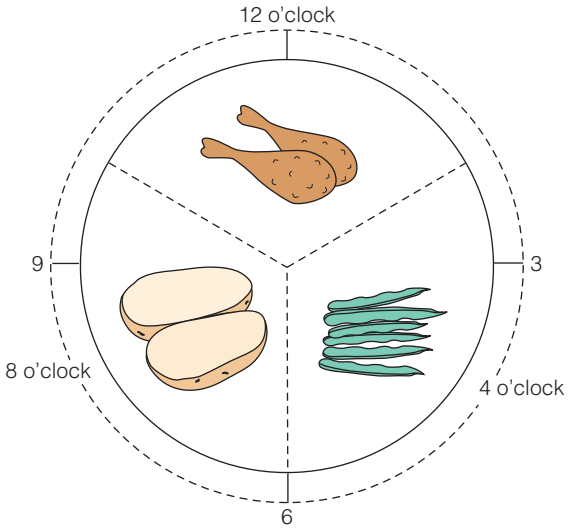


Figure 47–8 ■ For a client who is visually impaired, the nurse can use the clock system to describe the location of food on the plate.

and fit over the client's hand. Clients requiring pureed or liquid diets are sometimes fed with a feeding syringe.

Plates with rims and plastic or metal plate guards enable the client to pick up the food by first pushing it against this raised edge. A suction cup or damp sponge or cloth may be placed under the dish to keep it from moving while the client is eating. No-spill mugs and two-handled drinking cups are especially useful for individuals with impaired hand coordination. Stretch terry cloth and knitted or crocheted glass covers enable the client to keep a secure grasp on a glass. Lidded tip-proof glasses are also available. Figures 47–9 ■ and 47–10 ■ show some of these aids.

Figure 47–9 ■ Left to right: glass holder, cup with hole for nose, two-handled cup holder.

Special Community Nutritional Services

In many places, community programs have been developed to help special groups meet nutritional needs. For older adults who cannot prepare meals or leave their homes, ready-to-eat meals or frozen dinners are delivered to the home by local organizations. Meals-on-Wheels is one such well-known organization.

Figure 47–10 ■ Dinner plate with guard attached and lipped plate facilitate scooping; wide-handled spoon and knife facilitate grip.

For people who can prepare meals but have physical disabilities and cannot shop for groceries, grocery delivery services are available.

For the poor in the United States, the USDA funds the Supplemental Nutrition Assistance Program. Through this program, people with low incomes can use stamps to purchase food at any approved grocery store. The value of the food stamps provided depends on the size and income of the family.

Enteral Nutrition

Alternative feeding methods that ensure adequate nutrition include **enteral** (through the GI system) methods. Enteral nutrition (EN), also referred to as total enteral nutrition (TEN), is provided when the client cannot ingest foods or the upper GI tract is impaired and the transport of food to the small intestine is interrupted. Enteral feedings are administered through nasogastric and small-bore feeding tubes, or through gastrostomy or jejunostomy tubes.

Enteral Access Devices

Enteral access is achieved by means of nasogastric or nasointestinal (nasoenteric) tubes, or gastrostomy or jejunostomy tubes.

A **nasogastric tube** is inserted through one of the nostrils, down the nasopharynx, and into the alimentary tract. Traditional firm, large-bore nasogastric tubes (i.e., those larger than 12 Fr in diameter) are placed into the stomach. Examples are the Levin tube, a flexible rubber or plastic, single-lumen tube with holes near the tip, and the Salem sump tube, with a double lumen (Figure 47–11 ■). The larger lumens allow delivery of liquids to the stomach or removal of gastric contents. When the Salem tube is used for suction of gastric contents, the smaller vent lumen (the proximal port is often referred to as the *blue pigtail*) allows for an inflow of atmospheric air, which prevents a vacuum if the gastric tube adheres to the wall of the stomach. Irritation of the gastric mucosa is thereby avoided. Softer, more flexible and less irritating small-bore feeding tubes (SBFTs), smaller than 12 Fr in diameter, are frequently used for enteral nutrition (Figure 47–12 ■).

Nasogastric tubes are used for feeding clients who have adequate gastric emptying, and who require short-term feedings. They are not advised for feeding clients without intact gag and cough reflexes since the risk of accidental placement of the tube into the lungs is much higher in those clients. Skill 47–1 provides guidelines for inserting a nasogastric tube. Skill 47–4 later in this chapter outlines the steps for removing a nasogastric tube.

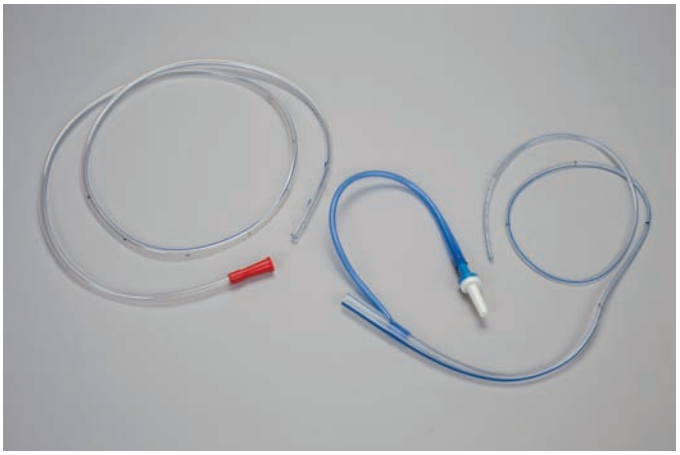


Figure 47–11 ■ *Left,* Single-lumen Levin tube. *Right,* Double-lumen Salem sump tube with filter on air vent port.

Figure 47–12 ■ A polyurethane feeding tube designed for nasogastric and nasoduodenal feeding with a weighted tip for easier insertion. The feeding port is incompatible with luer lock or IV connections, reducing the risk of accidental connection or infusion. Tubes can be 8Fr-12Fr and 36"-55" long.
Courtesy Covidien.

SKILL 47–1

Inserting a Nasogastric Tube

PURPOSES

- To administer tube feedings and medications to clients unable to eat by mouth or swallow a sufficient diet without aspirating food or fluids into the lungs
- To establish a means for suctioning stomach contents to prevent gastric distention, nausea, and vomiting
- To remove stomach contents for laboratory analysis
- To lavage (wash) the stomach in case of poisoning or overdose of medications

ASSESSMENT

- Check for history of nasal surgery or deviated septum. Assess patency of nares.
- Determine presence of gag reflex.
- Assess mental status or ability to participate in the procedure.

Inserting a Nasogastric Tube—*continued*

PLANNING

Before inserting a nasogastric tube, determine the size of tube to be inserted and whether the tube is to be attached to suction.

DELEGATION

Insertion of a nasogastric tube is an invasive procedure requiring application of knowledge (e.g., anatomy and physiology, risk factors) and problem solving. In some agencies, only health care providers with advanced training are permitted to insert nasogastric tubes that require use of a stylet. Delegation of this skill to unlicensed assistive personnel (UAP) is not appropriate. The UAP, however, can assist with the oral hygiene needs of a client with a nasogastric tube.

INTERPROFESSIONAL PRACTICE

Inserting a nasogastric tube may be within the scope of practice for some other health care providers such as physician assistants (PAs). Although the PA may verbally communicate their actions and plan to the health care team members, the nurse must also know where to locate their documentation in the client's medical record.

Equipment

- Large- or small-bore tube (nonlatex preferred)
- Nonallergenic adhesive tape, 2.5 cm (1 in.) wide
- Commercial securement device, if available
- Clean gloves
- Water-soluble lubricant
- Facial tissues
- Glass of water and drinking straw
- 20- to 50-mL catheter-tip syringe
- Basin
- pH test strip or meter
- Bilirubin dipstick
- Stethoscope
- Disposable pad or towel
- Antireflux valve for air vent if Salem sump tube is used
- Suction apparatus
- Safety pin and elastic band
- Clamp or plug (optional)
- CO_2 detector (optional)

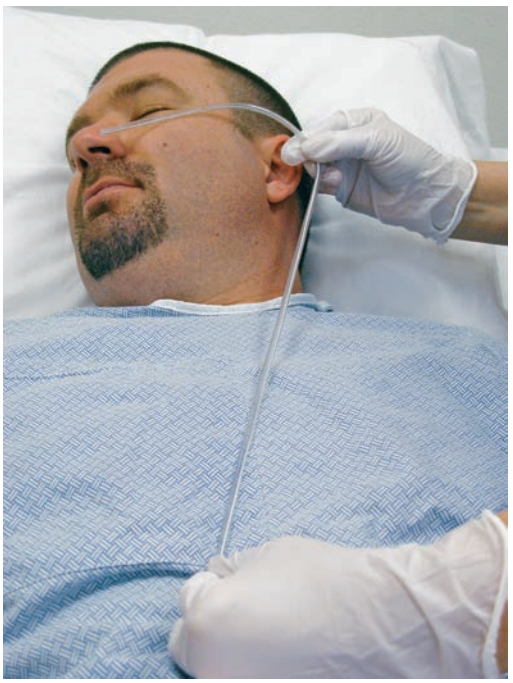
IMPLEMENTATION

Preparation

- Assist the client to a high-Fowler's position if his or her health condition permits, and support the head on a pillow. **Rationale:** *It is often easier to swallow in this position and gravity helps the passage of the tube.*
- Place a towel or disposable pad across the chest.

Performance

1. Prior to performing the insertion, introduce self and verify the client's identity using agency protocol. Explain to the client what you are going to do, why it is necessary, and how he or she can participate. The passage of a gastric tube is unpleasant because the gag reflex is activated during insertion. Establish a method for the client to indicate distress and a desire for you to pause the insertion. Raising a finger or hand is often used for this.
2. Perform hand hygiene and observe other appropriate infection prevention procedures (e.g., clean gloves).
3. Provide for client privacy.
4. Assess the client's nares.
   - Apply clean gloves.
   - Ask the client to hyperextend the head, and, using a flashlight, observe the intactness of the tissues of the nostrils, including any irritations or abrasions.
   - Examine the nares for any obstructions or deformities by asking the client to breathe through one nostril while occluding the other.
   - Select the nostril that has the greater airflow.
5. Prepare the tube.
   - If a small-bore tube is being used, ensure stylet or guidewire is secured in position. **Rationale:** *An improperly positioned stylet or guidewire can traumatize the nasopharynx, esophagus, and stomach.*
   - If a large-bore tube is being used, place the tube in a basin of warm water while preparing the client. **Rationale:** *This allows the tubing to become more pliable and flexible. However, if the softened tube becomes difficult to control, it may be helpful to place the distal end in a basin of ice water to help it hold its shape.*



❶ Measuring the appropriate length to insert a nasogastric tube.

6. Determine how far to insert the tube.
   - Use the tube to mark off the distance from the tip of the client's nose to the tip of the earlobe and then from the tip of the earlobe to the tip of the xiphoid. ❶ **Rationale:** *This length approximates the distance from the nares to the stomach. This distance varies among individuals.*
   - Mark this length with adhesive tape if the tube does not have markings.
7. Insert the tube.
   - Lubricate the tip of the tube well with water-soluble lubricant or water to ease insertion. In some agencies, topical

Continued on page 1156

Inserting a Nasogastric Tube—*continued*

SKILL 47–1

lidocaine anesthetic is used on the tube or in the client's nose to numb the area (Uri, Yosefov, Haim, Behrbalk, & Halpern, 2011). **Rationale:** *A water-soluble lubricant dissolves if the tube accidentally enters the lungs. An oil-based lubricant, such as petroleum jelly, will not dissolve and could cause respiratory complications if it enters the lungs.*

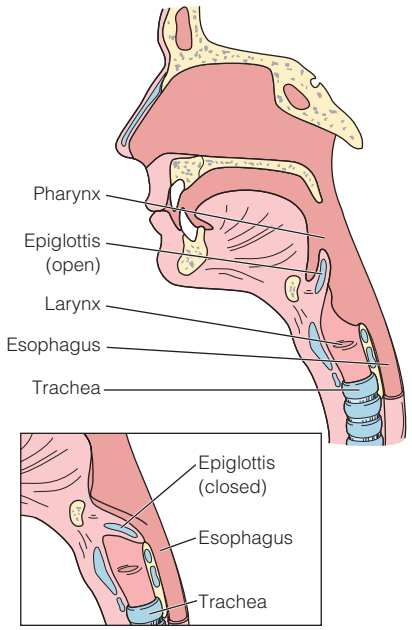
- Insert the tube, with its natural curve downward, into the selected nostril. Ask the client to hyperextend the neck, and gently advance the tube toward the nasopharynx. **Rationale:** *Hyperextension of the neck reduces the curvature of the nasopharyngeal junction.*
- Direct the tube along the floor of the nostril and toward the midline. **Rationale:** *Directing the tube along the floor avoids the projections (turbinates) along the lateral wall.*
- Slight pressure and a twisting motion are sometimes required to pass the tube into the nasopharynx, and some client's eyes may water at this point. **Rationale:** *Tears are a natural body response. Provide the client with tissues as needed.*
- If the tube meets resistance, withdraw it, relubricate it, and insert it in the other nostril. **Rationale:** *The tube should never be forced against resistance because of the danger of injury.*
- Once the tube reaches the oropharynx (throat), the client will feel the tube in the throat and may gag and retch. Ask the client to tilt the head forward, and encourage the client to drink and swallow. **Rationale:** *Tilting the head forward facilitates passage of the tube into the posterior pharynx and esophagus rather than into the larynx; swallowing moves the epiglottis over the opening to the larynx.* ❷
- If the client gags, stop passing the tube momentarily. Have the client rest, take a few breaths, and take sips of water to calm the gag reflex.
- In cooperation with the client, pass the tube 5 to 10 cm (2 to 4 in.) with each swallow, until the indicated length is inserted.
- If the client continues to gag and the tube does not advance with each swallow, withdraw it slightly, and inspect the throat by looking through the mouth. **Rationale:** *The tube may be coiled in the throat. If so, withdraw it until it is straight, and try again to insert it.*
- If a CO_2 detector is used, after the tube has been advanced approximately 30 cm (12 in.), draw air through the detector. Any change in color of the detector indicates placement of the tube in the respiratory tract. Immediately withdraw the tube and reinsert.

8. Ascertain correct placement of the tube.

- Nasogastric tubes are radiopaque, and position can be confirmed by x-ray. If a SBFT is used, leave the stylet or guidewire in place until correct position is verified by x-ray. This is the only definitive method of verifying feeding tube tip placement. If an x-ray is not feasible, at least two of the following methods should be used.

SAFETY ALERT! SAFETY

If the stylet has been removed, never reinsert it while the tube is in place. **Rationale:** *The stylet is sharp and could pierce the tube and injure the client or cut off the tube end.*



❷ Swallowing closes the epiglottis.

- Aspirate stomach contents, and check the pH, which should be acidic. **Rationale:** *Testing pH is a reliable way to determine location of a feeding tube. Gastric contents are commonly pH 1 to 5; 6 or greater would indicate the contents are from lower in the intestinal tract or in the respiratory tract. However, pH may not discriminate between gastric and esophageal placement* (Stepter, 2012).
- Aspirate can also be tested for bilirubin. Bilirubin levels in the lungs should be almost zero, while levels in the stomach will be approximately 1.5 mg/dL and in the intestine more than 10 mg/dL.
- Historically, nurses placed a stethoscope over the client's epigastrium and injected 10 to 30 mL of air into the tube while listening for a whooshing sound. This method does not guarantee tube position.
- If the signs indicate placement in the lungs, remove the tube and begin again.
- If the signs do not indicate placement in the lungs or stomach, advance the tube 5 cm (2 in.), and repeat the tests.

9. Secure the tube by taping it to the bridge of the client's nose.

- If the client has oily skin, wipe the nose first with alcohol to defat the skin.
- Apply a commercial securement device

or

- Cut 7.5 cm (3 in.) of tape, and split it lengthwise at one end, leaving a 2.5-cm (1-in.) tab at the end.
- Place the tape over the bridge of the client's nose, and bring the split ends either under and around the tubing, or under the tubing and back up over the nose. ❸ Ensure that the tube is centrally located prior to securing with tape to maximize airflow and prevent irritation to the side of the nares. **Rationale:** *Taping in this manner prevents the tube from pressing against and irritating the edge of the nostril.*

Inserting a Nasogastric Tube—*continued*

3 Taping a nasogastric tube to the bridge of the nose.

10. Once correct position has been determined, attach the tube to a suction source or feeding apparatus as ordered, or clamp the end of the tubing.
11. Secure the tube to the client's gown.
    - Loop an elastic band around the end of the tubing, and attach the elastic band to the gown with a safety pin.

    or

    - Attach a piece of adhesive tape to the tube, and pin the tape to the gown. **Rationale:** *The tube is attached to prevent it from dangling and pulling.*

    If a Salem sump tube is used, attach the antireflux valve to the vent port (if used) and position the port above the client's waist. **Rationale:** *This prevents gastric contents from flowing into the vent lumen.*
    - Remove and discard gloves.
    - Perform hand hygiene.
12. Document relevant information: the insertion of the tube, the means by which correct placement was determined, and client responses (e.g., discomfort or abdominal distention).
13. Establish a plan for providing daily nasogastric tube care.
    - Inspect the nostril for discharge and irritation.
    - Clean the nostril and tube with moistened, cotton-tipped applicators.
    - Apply water-soluble lubricant to the nostril if it appears dry or encrusted.
    - Change the adhesive as required.
    - Give frequent mouth care. Due to the presence of the tube, the client may breathe through the mouth.
14. If suction is applied, ensure that the patency of both the nasogastric and suction tubes is maintained.
    - Irrigation of the tube may be required at regular intervals. In some agencies, irrigations must be ordered by the primary care provider. Prior to each irrigation, recheck tube placement.
    - If a Salem sump tube is used, follow agency policies for irrigating the vent lumen with air to maintain patency of the suctioning lumen. Often, a sucking sound can be heard from the vent port if it is patent.
    - Keep accurate records of the client's fluid intake and output, and record the amount and characteristics of the drainage.
15. Document the type of tube inserted, date and time of tube insertion, type of suction used, color and amount of gastric contents, and the client's tolerance of the procedure.

SAMPLE DOCUMENTATION

11/5/15 1030 #8 Fr feeding tube inserted without difficulty through R nare with stylet in place. To x-ray to check placement. Radiologist reports tube tip in stomach. Stylet removed. Aspirate pH 4. Tube secured to nose. Pt. verbalizes understanding of need to not pull on tube. ——————————— L. Traynor, RN

EVALUATION

Conduct appropriate follow-up, such as degree of client comfort, client tolerance of the nasogastric tube, correct placement of nasogastric tube in stomach, client understanding of restrictions, color and amount of gastric contents if attached to suction, or stomach contents aspirated.

LIFESPAN CONSIDERATIONS Inserting a Nasogastric Tube

INFANTS AND YOUNG CHILDREN

- Restraints may be necessary during tube insertion and throughout therapy. Restraints will prevent accidental dislodging of the tube.
- Place the infant in an infant seat or position the infant with a rolled towel or pillow under the head and shoulders.
- When assessing the nares, obstruct one of the infant's nares and feel for air passage from the other. If the nasal passageway is very small or is obstructed, an orogastric tube may be more appropriate.
- Measure appropriate nasogastric tube length from the nose to the tip of the earlobe and then to the point midway between the umbilicus and the xiphoid process.
- If an orogastric tube is used, measure from the tip of the earlobe to the corner of the mouth to the xiphoid process.
- Do not hyperextend or hyperflex an infant's neck. Hyperextension or hyperflexion of the neck could occlude the airway.
- Tape the tube to the area between the end of the nares and the upper lip as well as to the cheek.

Although the focus of this chapter is nutrition, nasogastric tubes may be inserted for reasons other than to provide a route for feeding the client, including these:

- To prevent nausea, vomiting, and gastric distention following surgery. In this case, the tube is attached to a suction source.
- To remove stomach contents for laboratory analysis.
- To lavage (wash) the stomach in cases of poisoning or overdose of medications.

A **nasoenteric (nasointestinal) tube**, a longer tube than the nasogastric tube (at least 40 cm [15.75 in.] for an adult), is inserted through one nostril down into the upper small intestine. See Figure 47–13*A* ■. Some agencies require specially trained nurses or primary care providers to perform this procedure. Nasoenteric tubes are used for clients who are at risk for aspiration. Clients at risk for aspiration are those who manifest the following:

- Decreased level of consciousness
- Poor cough or gag reflexes
- Inability to participate in the procedure
- Restlessness or agitation.

Gastrostomy and **jejunostomy** devices are used for long-term nutritional support, generally more than 6 to 8 weeks. Tubes are placed surgically or by laparoscopy through the abdominal wall into the stomach (gastrostomy) or into the jejunum (jejunostomy). See Figure 47–13*B* ■. A **percutaneous endoscopic gastrostomy (PEG)** (Figure 47–14 ■) or **percutaneous endoscopic jejunostomy (PEJ)** (Figure 47–15 ■) is created by using an endoscope to visualize the inside of the stomach, making a puncture through the skin and subcutaneous tissues of the abdomen into the stomach, and inserting the PEG or PEJ catheter through the puncture.

The surgical opening is sutured tightly around the tube or catheter to prevent leakage. Care of this opening before it heals requires surgical asepsis. The catheter has an external bumper and an internal inflatable retention balloon to maintain placement. When the tract is established (about 1 month), the tube or catheter can be removed and reinserted for each feeding. Alternatively, a skin-level tube can be used that remains in place (Figure 47–16 ■). A feeding set is attached when needed.

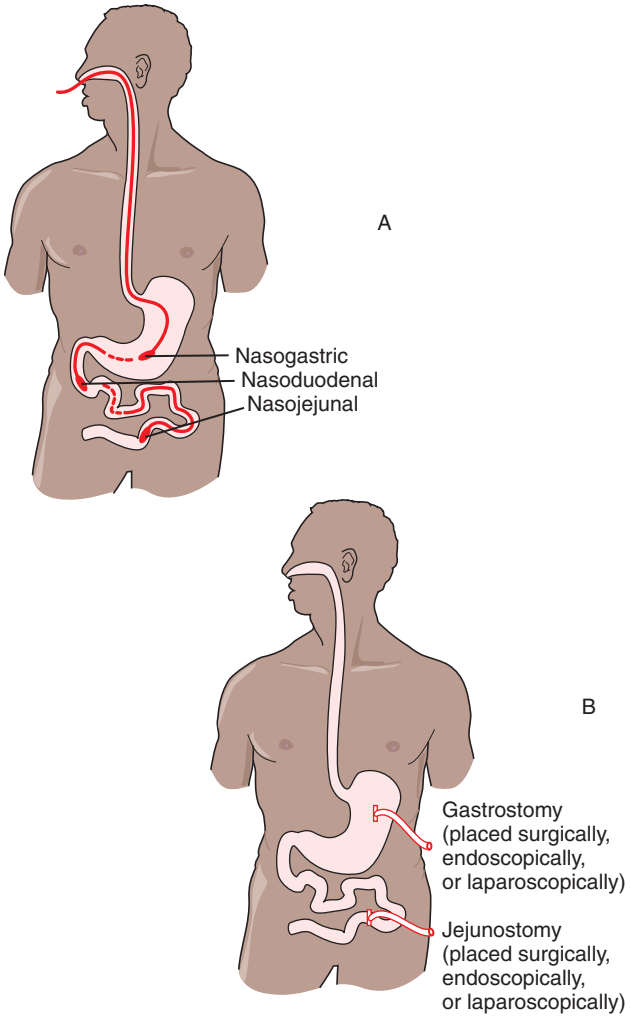


Figure 47–13 ■ Placements for enteral access: *A,* for nasoenteric/nasointestinal tubes; *B,* for gastrostomy and jejunostomy tubes.

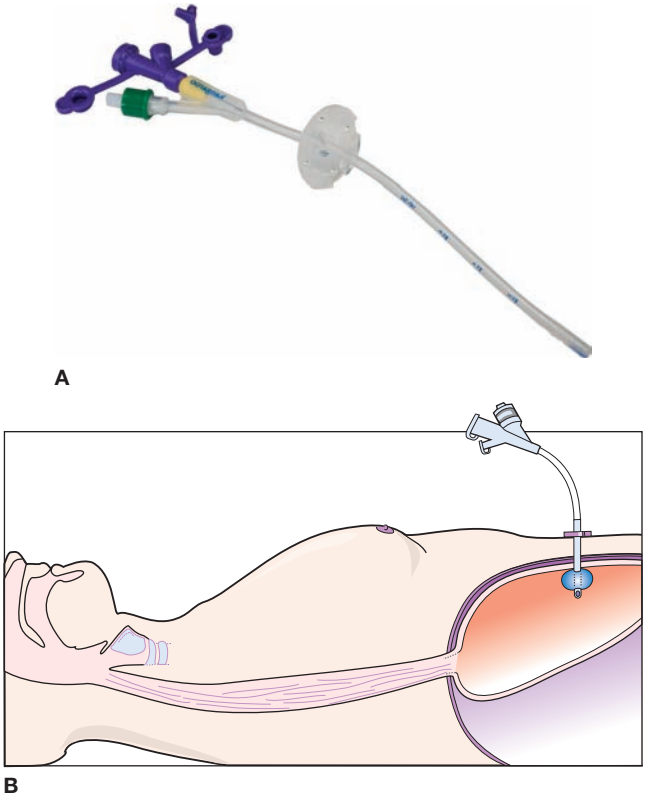


Figure 47–14 ■ Percutaneous endoscopic gastrostomy (PEG) tube. *A,* Courtesy Covidien.

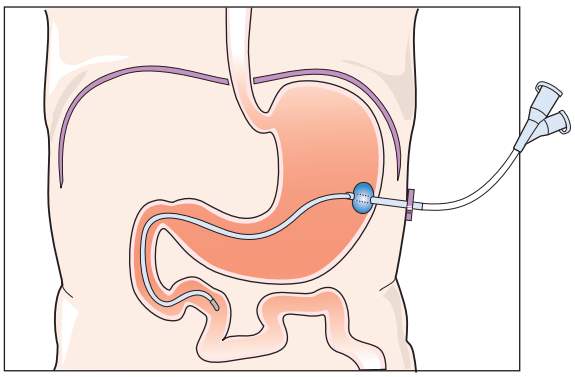


Figure 47–15 ■ Percutaneous endoscopic jejunostomy (PEJ) tube.

Figure 47–16 ■ Low-profile gastrostomy feeding tubes.
Courtesy Covidien.

Testing Feeding Tube Placement

Before feedings are introduced, tube placement is confirmed by radiography, particularly when a small-bore tube has been inserted or when the client is at risk for aspiration. After placement is confirmed, the nurse marks the tube with indelible ink or tape at its exit point from the nose and documents the length of visible tubing for baseline data. The nurse is responsible, however, for verifying tube placement (i.e., GI placement versus respiratory placement) before each intermittent feeding and at regular intervals (e.g., at least once per shift) when continuous feedings are being administered.

Methods nurses use to check tube placement include the following:

1. ***Aspirate GI secretions.*** Because small-bore tubes offer more resistance during aspirations than large-bore tubes and are more likely to collapse when negative pressure is applied, it may not be possible to obtain an aspirate. If obtained, gastric secretions tend to be a grassy-green, off-white, or tan color; intestinal fluid is stained with bile and has a golden yellow or brownish green color.
2. ***Measure the pH of aspirated fluid.*** Testing the pH of aspirates can help distinguish gastric from respiratory and intestinal placement as follows:
   - Gastric aspirates tend to be acidic and have a pH of 1 to 4 but may be as high as 6 if the client is receiving medications that control gastric acid.
   - Small intestine aspirates generally have a pH equal to or higher than 6.
   - Respiratory secretions are more alkaline with values of 7 or higher. However, there is a slight possibility of respiratory placement when the pH reading is as low as 5.

   Therefore, when pH readings are 5 or higher, radiographic confirmation of tube location needs to be considered, especially in clients with diminished cough and gag reflexes.
3. Confirm length of tube insertion with the insertion mark. If more of the tube is now exposed, the position of the tip should be questioned.

Currently, the most effective method is radiographic verification of tube placement. Repeated x-ray studies, however, are not feasible in terms of cost. More research is required to devise effective alternatives, especially for placement of small-bore tubes. In the meantime, nurses should (a) ensure initial radiographic verification of small-bore tubes, (b) aspirate contents when possible and check their acidity, (c) closely observe the client for signs of obvious distress, and (d) consider tube dislodgment after episodes of coughing, sneezing, and vomiting.

Enteral Feedings

The type and frequency of feedings and amounts to be administered are ordered by the primary care provider. Liquid feeding mixtures are available commercially or may be prepared by the dietary department in accordance with the primary care provider's orders. A standard formula provides 1 Kcal per milliliter of solution with protein, fat, carbohydrate, minerals, and vitamins in specified proportions.

Enteral feedings can be given intermittently or continuously. Intermittent feedings are the administration of 300 to 500 mL of enteral formula several times per day. The stomach is the preferred site for these feedings, which are usually administered over at least 30 minutes. Initial intermittent feedings should be no more than 120 mL. If tolerated, increase by 120 mL each feeding until the goal is reached (DeBruyne & Pinna, 2014). Bolus intermittent feedings are those that use a syringe to deliver the formula into the stomach. Because the formula is delivered rapidly by this method, it is not usually recommended but may be used in long-term situations if the client tolerates it. These feedings must be given only into the stomach; the client must be monitored closely for distention and aspiration.

Continuous feedings are generally administered over a 24-hour period using an infusion pump (often referred to as a kangaroo pump) that guarantees a constant flow rate (Figure 47–17 ■). Initial intermittent feedings should be no more than 60 mL per hour. If tolerated,

Figure 47–17 ■ An enteric feeding pump.

increase by 20 mL each feeding until the goal is reached (DeBruyne & Pinna, 2014). Continuous feedings are essential when feedings are administered in the small bowel. Pumps are also used when smaller bore gastric tubes are in place or when gravity flow is insufficient to instill the feeding.

Cyclic feedings are continuous feedings that are administered in less than 24 hours (e.g., 12 to 16 hours). These feedings, often administered at night, allow the client to attempt to eat regular meals through the day. Because nocturnal feedings may use higher nutrient densities and higher infusion rates than the standard continuous feeding, particular attention needs to be given to monitoring fluid status and circulating volume.

Enteral feedings are administered to clients through open or closed systems. Open systems use an open-top container or a syringe for administration. Enteral feedings for use with open systems are provided in flip-top cans or powdered formulas that are reconstituted with sterile water. Sterile water, rather than tap water, reduces the risk of microbial contamination. Open systems should have no more than 8 to 12 hours of formula poured at one time (DeBruyne & Pinna, 2014). At the completion of this time, remaining formula should be discarded and the container rinsed before new formula is poured. The bag and tubing should be replaced every 24 hours. Closed systems consist of a prefilled container that is spiked with enteral tubing and attached to the enteral access device. Prefilled containers can hang safely for 48 hours if sterile technique is used. Closed system materials are more expensive than open system materials, but if nursing care costs are included, closed systems are less expensive (Phillips, Roman, & Glassman, 2013).

A rare but potentially fatal complication of tube feeding is **refeeding syndrome**—a combination of fluid and electrolyte shifts that can occur after a lengthy period of malnutrition or starvation. This syndrome can occur when the starving body converts from creating glucose from carbohydrates to creating it from protein stores since carbohydrate was unavailable. The body's reaction to the sudden presence of glucose and synthesis of protein leads to the shifts. People at high risk for developing refeeding syndrome are those with chronic alcoholism, anorexia nervosa, massive weight loss, cancer clients receiving chemotherapy, or anyone who has gone 7 to 10 days without food. The nurse takes a detailed history and examines laboratory data that can indicate malnutrition, such as albumin and prealbumin levels. Serum potassium, calcium, phosphate, and magnesium levels must be checked and supplemented until within normal levels before feeding. Some experts suggest beginning feeding for at-risk clients with less than the desired amount and increasing to the full desired daily feeding slowly (DeBruyne & Pinna, 2014).

Skill 47–2 provides the essential steps involved in administering a tube feeding, and Skill 47–3 indicates the steps involved in administering a gastrostomy or jejunostomy tube feeding.

CLINICAL ALERT!

Enteral feedings should be started postoperatively in surgical clients without the need to wait for flatus or a bowel movement (Metheny, Mills, & Stewart, 2012).

Administering a Tube Feeding

SKILL 47–2

PURPOSES
- To restore or maintain nutritional status
- To administer medications

ASSESSMENT

Assess
- For any clinical signs of malnutrition or dehydration.
- For allergies to any food in the feeding. If the client is lactose intolerant, check the tube feeding formula. Notify the primary care provider if any incompatibilities exist.
- For the presence of bowel sounds.
- For any problems that suggest lack of tolerance of previous feedings (e.g., delayed gastric emptying, abdominal distention, diarrhea, cramping, or constipation).

PLANNING

Before commencing a tube feeding, determine the type, amount, and frequency of feedings and tolerance of previous feedings.

DELEGATION

Administering a tube feeding requires application of knowledge and problem solving and it is not usually delegated to UAP. Some agencies, however, may allow a trained UAP to administer a feeding if allowed by law (for example, in California, UAPs are prohibited from performing tube feedings by the Nursing Practice Act). In any case, it is the responsibility of the nurse to assess tube placement and determine that the tube is patent, reinforce major points, such as making sure the client is sitting upright, and instruct the UAP to report any difficulty administering the feeding or any complaints voiced by the client.

INTERPROFESSIONAL PRACTICE

Administering a tube feeding is generally not performed by other health care providers, although it may not be prohibited by their scope of practice.

Equipment
- Correct type and amount of feeding solution
- 60-mL catheter-tip syringe
- Emesis basin
- Clean gloves
- pH test strip or meter
- Large syringe or calibrated plastic feeding bag with label and tubing that can be attached to the feeding tube or prefilled bottle with a drip chamber, tubing, and a flow-regulator clamp
- Measuring container from which to pour the feeding (if using open system)
- Water (60 mL unless otherwise specified) at room temperature
- Feeding pump as required

SAFETY ALERT! SAFETY

Do not add colored food dye to tube feedings. Previously, blue dye was often added to assist in recognition of aspiration. However, the FDA reports cases of many adverse reactions to the dye, including toxicity and death.

Administering a Tube Feeding—*continued*

IMPLEMENTATION

Preparation

Assist the client to a Fowler's position (at least 30° elevation) in bed or a sitting position in a chair, the normal position for eating. If a sitting position is contraindicated, a slightly elevated right side-lying position is acceptable. **Rationale:** *These positions enhance the gravitational flow of the solution and prevent aspiration of fluid into the lungs.*

Performance

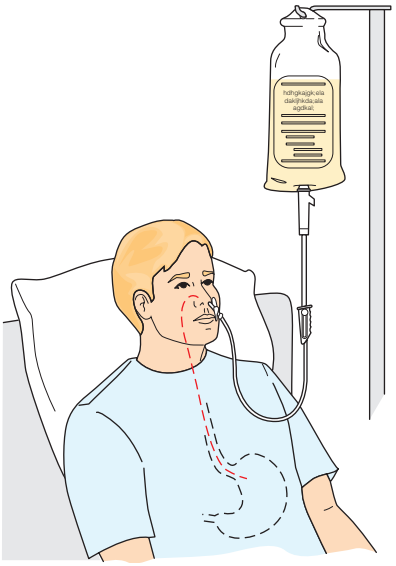
1. Prior to performing the feeding, introduce self and verify the client's identity using agency protocol. Explain to the client what you are going to do, why it is necessary, and how he or she can participate. Inform the client that the feeding should not cause any discomfort but may cause a feeling of fullness.
2. Perform hand hygiene and observe other appropriate infection prevention procedures (e.g., clean gloves).
3. Provide privacy for this procedure if the client desires it. Tube feedings are embarrassing to some people.
4. Assess tube placement.
   - Apply clean gloves.
   - Attach the syringe to the open end of the tube and aspirate. Check the pH.
   - Allow 1 hour to elapse before testing the pH if the client has received a medication.
   - Use a pH meter rather than pH paper if the client is receiving a continuous feeding. Follow agency policy if the pH is equal to or greater than 6.
5. Assess residual feeding contents.
   - If the tube is placed in the stomach, aspirate all contents and measure the amount before administering the feeding. **Rationale:** *This is done to evaluate absorption of the last feeding; that is, whether undigested formula from a previous feeding remains. If the tube is in the small intestine, residual contents cannot be aspirated.*
   - If 100 mL (or more than half the last feeding) is withdrawn, check with the nurse in charge or refer to agency policy before proceeding. The precise amount is usually determined by the primary care provider's order or by agency policy. **Rationale:** *At some agencies, a feeding is delayed when the specified amount or more of formula remains in the stomach.*

   or

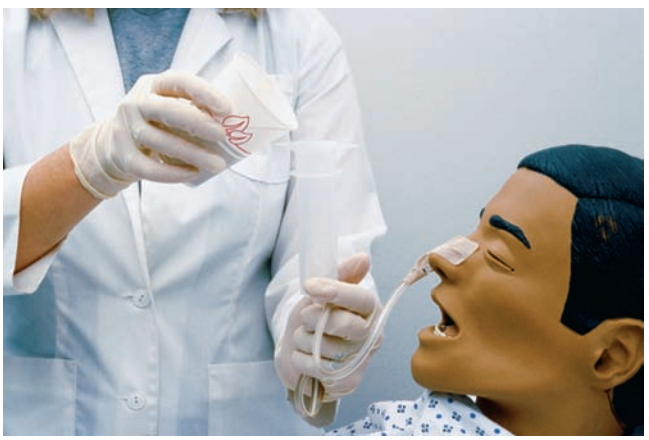
   - Reinstill the gastric contents into the stomach if this is the agency policy or primary care provider's order. **Rationale:** *Removal of the contents could disturb the client's electrolyte balance.*
   - If the client is on a continuous feeding, check the gastric residual every 4 to 6 hours or according to agency protocol.
6. Administer the feeding.
   - Before administering feeding:
     a. Check the expiration date of the feeding.
     b. Warm the feeding to room temperature. **Rationale:** *An excessively cold feeding may cause abdominal cramps.*
   - When an open system is used, clean the top of the feeding container with alcohol before opening it. **Rationale:** *This minimizes the risk of contaminants entering the feeding syringe or feeding bag.*

   Feeding Bag (Open System)
   - Apply a label that indicates the date, time of starting the feeding, and nurse's initials on the feeding bag. Hang the labeled bag from an infusion pole about 30 cm (12 in.) above the tube's point of insertion into the client. **Rationale:** *At this height, the formula should run at a safe rate into the stomach or intestine.*
   - Clamp the tubing and add the formula to the bag.
   - Open the clamp, run the formula through the tubing, and reclamp the tube. **Rationale:** *The formula will displace the air in the tubing, thus preventing the instillation of excess air into the client's stomach or intestine.*
   - Attach the bag to the feeding tube ❶ and regulate the drip by adjusting the clamp to the drop factor on the bag (e.g., 20 drops/mL) if not placed on a pump.

   Syringe (Open System)
   - Remove the plunger from the syringe and connect the syringe to a pinched or clamped nasogastric tube. **Rationale:** *Pinching or clamping the tube prevents excess air from entering the stomach and causing distention.*
   - Add the feeding to the syringe barrel. ❷



❶ Using a calibrated plastic bag to administer a tube feeding.



❷ Using the barrel of a syringe to administer a tube feeding.

Continued on page 1162

Administering a Tube Feeding—*continued*

SKILL 47–2

3 Feeding set with spike and tubing. Note, the port on the cap can only be accessed using this special safety screw spike to prevent accidental connection using intravenous tubing.
Courtesy Covidien.

- Permit the feeding to flow in slowly at the prescribed rate. Raise or lower the syringe to adjust the flow as needed. Pinch or clamp the tubing to stop the flow for a minute if the client experiences discomfort. **Rationale:** *Quickly administered feedings can cause flatus, cramps, and/or vomiting.*

Prefilled Bottle with Drip Chamber (Closed System)

- Remove the screw-on cap from the container and attach the administration set with tubing. 3
- Close the clamp on the tubing.
- Hang the container on an intravenous (IV) pole about 30 cm (12 in.) above the tube's insertion point into the client. **Rationale:** *At this height, the formula should run at a safe rate into the stomach or intestine.*
- Squeeze the drip chamber to fill it to one third to one half of its capacity.
- Open the tubing clamp, run the formula through the tubing, and reclamp the tube. **Rationale:** *The formula will displace the air in the tubing, thus preventing the instillation of excess air.*
- Attach the feeding set tubing to the feeding tube and regulate the drip rate to deliver the feeding over the desired length of time or attach to a feeding pump.

7. If another bottle is not to be immediately hung, flush the feeding tube before all of the formula has run through the tubing.

- Instill 50 to 100 mL of water through the feeding tube or medication port. **Rationale:** *Water flushes the lumen of the tube, preventing future blockage by sticky formula.*
- Be sure to add the water before the feeding solution has drained from the neck of a syringe or from the tubing of an administration set. **Rationale:** *Adding the water before the syringe or tubing is empty prevents the instillation of air into the stomach or intestine and thus prevents unnecessary distention.*

8. Clamp the feeding tube.

- Clamp the feeding tube before all of the water is instilled. **Rationale:** *Clamping prevents air from entering the tube.*

9. Ensure client comfort and safety.

- Secure the tubing to the client's gown. **Rationale:** *This minimizes pulling of the tube, thus preventing discomfort and dislodgment.*
- Ask the client to remain sitting upright in Fowler's position or in a slightly elevated right lateral position for at least 30 minutes. **Rationale:** *These positions facilitate digestion and movement of the feeding from the stomach along the alimentary tract, and prevent the potential aspiration of the feeding into the lungs.*
- Check the agency's policy on the frequency of changing the nasogastric tube and the use of smaller lumen tubes if a large-bore tube is in place. **Rationale:** *These measures prevent irritation and erosion of the pharyngeal and esophageal mucous membranes.*

10. Dispose of equipment appropriately.

- If the equipment is to be reused, wash it thoroughly with soap and water so that it is ready for reuse.
- Change the equipment every 24 hours or according to agency policy.
- Remove and discard gloves.
- Perform hand hygiene.

11. Document all relevant information.

- Document the feeding, including amount and kinds of fluids administered (feeding plus any water used to flush the tubing), duration of the feeding, and assessments of the client.
- Record the volume of the feeding and water administered on the client's intake and output record.

12. Monitor the client for possible problems.

- Carefully assess clients receiving tube feedings for problems.
- To prevent dehydration, give the client supplemental water in addition to the prescribed tube feeding as ordered.

Variation: Continuous-Drip Feeding

- Clamp the tubing at least every 4 to 6 hours, or as indicated by agency protocol or the manufacturer, and aspirate and measure the gastric contents. Then flush the tubing with 30 to 50 mL of water. **Rationale:** *This determines adequate absorption and verifies correct placement of the tube.* If placement of a small-bore tube is questionable, a repeat x-ray should be done.
- Determine agency protocol regarding withholding a feeding. Many agencies withhold the feeding if more than 75 to 100 mL of feeding is aspirated.
- To prevent spoilage or bacterial contamination, do not allow the feeding solution to hang longer than 12 hours for an open system and 48 hours for a closed system. Check agency policy or manufacturer's recommendations regarding time limits.
- Follow agency policy regarding how frequently to change the feeding bag and tubing. Changing the feeding bag and tubing every 24 hours reduces the risk of contamination.

SAMPLE DOCUMENTATION

11/5/15 1330 Aspirated 20 mL pale yellow fluid from NG tube, pH 4.5. Pt. in Fowler's position. 1 L room-temperature ordered formula begun @ 60 mL/hour on pump. No nausea reported. _____
_____ L. Traynor, RN

Administering a Tube Feeding—*continued*

SKILL 47–2

EVALUATION

Perform a follow-up examination of the following:

- Tolerance of feeding (e.g., nausea, cramping)
- Bowel sounds
- Regurgitation and feelings of fullness after feedings
- Weight gain or loss
- Fecal elimination pattern (e.g., diarrhea, flatulence, constipation)
- Skin turgor
- Urine output and specific gravity
- Glucose and acetone in urine.

Relate findings to previous assessment data if available. Report significant deviations from normal to the primary care provider.

Administering a Gastrostomy or Jejunostomy Feeding

SKILL 47–3

PURPOSES

See Skill 47–2.

ASSESSMENT

See Skill 47–2.

Planning

Before beginning a gastrostomy or jejunostomy feeding, determine the type and amount of feeding to be instilled, frequency of feedings, and any pertinent information about previous feedings (e.g., the positioning in which the client best tolerates the feeding).

DELEGATION

See Skill 47–2.

INTERPROFESSIONAL PRACTICE

See Skill 47–2.

Equipment

- Correct amount of feeding solution
- Graduated container and tubing with clamp to hold the feeding
- 60-mL catheter-tip syringe

For a Tube That Remains in Place

- Mild soap and water
- Clean gloves
- Petrolatum, zinc oxide ointment, or other skin protectant
- Precut 4×4 gauze squares
- Uncut 4×4 gauze squares
- Paper tape

For Tube Insertion

- Clean gloves
- Moisture-proof bag
- Water-soluble lubricant
- Feeding tube (if needed)

IMPLEMENTATION

Preparation

See Skill 47–2.

Performance

1. Prior to performing the feeding, introduce self and verify the client's identity using agency protocol. Explain to the client what you are going to do, why it is necessary, and how he or she can participate. Discuss how the results will be used in planning further care or treatments.
2. Perform hand hygiene and observe other appropriate infection prevention procedures (e.g., clean gloves).
3. Provide for client privacy.
4. Insert a feeding tube, if one is not already in place.
   - Wearing gloves, remove the dressing. Then discard the dressing and gloves in the moisture-proof bag.
   - Perform hand hygiene
   - Apply new clean gloves.
   - Lubricate the end of the tube, and insert it into the ostomy opening 10 to 15 cm (4 to 6 in.).
5. Check the location and patency of the tube.
   - Determine correct placement of the tube by aspirating secretions and checking the pH.
   - Follow agency policy for amount of residual formula. This may include withholding the feeding, rechecking in 3 to 4 hours, or notifying the primary care provider if a large residual remains.
   - For continuous feedings, check the residual every 4 to 6 hours and hold feedings according to agency policy.
   - Remove the syringe plunger. Pour 15 to 30 mL of water into the syringe, remove the tube clamp, and allow the water to flow into the tube. **Rationale:** *This determines the patency of the tube. If water flows freely, the tube is patent.*
   - If the water does not flow freely, notify the nurse in charge and/or primary care provider.
6. Administer the feeding.
   - Hold the barrel of the syringe 7 to 15 cm (3 to 6 in.) above the ostomy opening.
   - Slowly pour the solution into the syringe and allow it to flow through the tube by gravity.
   - Just before the syringe is empty, add 30 mL of water. **Rationale:** *Water flushes the tube and preserves its patency.*
   - If the tube is to remain in place, hold it upright, remove the syringe, and then clamp or plug the tube to prevent leakage.
   - If a tube was inserted for the feeding, remove it.
   - Remove and discard gloves.
   - Perform hand hygiene.

Continued on page 1164

Administering a Gastrostomy or Jejunostomy Feeding—*continued*

SKILL 47–3

7. Ensure client comfort and safety.
- After the feeding, ask the client to remain in the sitting position or a slightly elevated right lateral position for at least 30 minutes. **Rationale:** *This minimizes the risk of aspiration.*
- Assess status of peristomal skin. **Rationale:** *Gastric or jejunal drainage contains digestive enzymes that can irritate the skin. Document any redness and broken skin areas.*
- Check orders about cleaning the peristomal skin, applying a skin protectant, and applying appropriate dressings. Generally, the peristomal skin is washed with mild soap and water at least once daily. The tube may be rotated between thumb and forefinger to release any sticking and promote tract formation. Petrolatum, zinc oxide ointment, or other skin protectant may be applied around the stoma, and precut 4×4 gauze squares may be placed around the tube. The precut squares are then covered with regular 4×4 gauze squares, and the tube is coiled over them and taped in place.
- Observe for common complications of enteral feedings: aspiration, hyperglycemia, abdominal distention, diarrhea, and fecal impaction. Report findings to primary care provider. Often, a change in formula or rate of administration can correct problems.
- When appropriate, teach the client how to administer feedings and when to notify the health care provider concerning problems.

8. Document all assessments and interventions.

SAMPLE DOCUMENTATION

1/24/15 2045 No fluid aspirated from gastrostomy tube. Pt. in Fowler's position. 30 mL water flowed freely by gravity through tube. 250 mL room-temperature Ensure formula given over 20 minutes. No complaints of discomfort. ———————— L. Traynor, RN

EVALUATION
See Skill 47–2.

Evidence-Based Practice Is There a Difference in Effectiveness and Safety Between NG and PEG tubes?

EVIDENCE-BASED PRACTICE

This article is an update to the 2010 Cochrane Review on the same subject. Gomes et al. (2012) examined controlled studies comparing nasogastric tubes to PEG tubes used for feeding clients who had swallowing disorders. Because the use of these tubes is very common, it is important to know if there are differences in the incidence or severity of complications associated with their use. The major outcomes studied were intervention failures such as displacement, feeding interruption, blockage or leakage; nutritional status, mortality, complications and adverse events (e.g., aspiration, hemorrhage, pneumonia, wound infection, sinusitis, fistula); and time on enteral nutrition, quality of life, length of hospital stay, and costs and economic issues.

This review concluded that PEG tubes are associated with fewer serious complications than NG tubes. However, there were no differences in overall number of complications or mortality, and the use of PEG tubes is considerably more resource intensive and expensive.

IMPLICATIONS
One limitation of this review is the shortage of well-controlled studies. Only 686 clients were included in the combined review. Thus, more research is needed. However, the review does not conflict with the findings of previous reviews. Nurses must remember the difference between statistical differences and clinical differences in research findings. In cases where the expertise or human and financial resources do not allow for the use of PEG tubes, NG tubes are shown to be an effective alternative—especially if robust interventions are used to minimize the incidence of preventable complications.

LIFESPAN CONSIDERATIONS Administering a Tube Feeding

INFANTS AND YOUNG CHILDREN
- Feeding tubes may be removed after each feeding and reinserted at the next feeding to prevent irritation of the mucous membrane, nasal airway obstruction, and stomach perforation that may occur if the tube is left in place continuously. Check agency practice.
- Formula should not be allowed to hang more than 4 hours (DeBruyne & Pinna, 2014).
- Position a small child or infant in your lap, provide a pacifier, and hold and cuddle the child during feedings. This promotes comfort, supports the normal sucking instinct of the infant, and facilitates digestion.

OLDER ADULTS
- Physiological changes associated with aging may make the older adult more vulnerable to complications associated with enteral feedings. Decreased gastric emptying may necessitate checking frequently for gastric residual. Diarrhea from administering the feeding too fast or at too high a concentration may cause dehydration. If the feeding has a high concentration of glucose, assess for hyperglycemia because with aging, the body has a decreased ability to handle increased glucose levels.
- Conditions such as hiatal hernia and diabetes mellitus may cause the stomach to empty more slowly. This increases the risk of aspiration in a client receiving a tube feeding. Checking for gastric residual more frequently can help document this if it is an ongoing problem. Changing the formula or the rate of administration, repositioning the client, or obtaining a primary care provider's order for a medication to increase stomach emptying may resolve this problem.

Home Care Considerations **Administering a Tube Feeding** PATIENT-CENTERED CARE

- Teach and provide the client or caregiver the rationale for how to assess for tube placement using pH measurement before administering the feeding. Instruct regarding actions to take if the pH is greater than 5.
- Provide instructions and rationale for care of the tube and insertion site.
- Discuss strategies for hanging formula containers if an IV pole is unavailable or inconvenient.
- Plan for optimal timing of feedings to allow for daily activities. Many clients can tolerate having the majority of their feedings run during sleep so they are free from the equipment during the day.
- Teach signs and symptoms to report to the primary care provider or home health nurse.

TABLE 47–5 Assessing Clients Receiving Tube Feedings

Assessments	Rationale
Allergies to any food in the feeding	Common allergenic foods include milk, sugar, water, eggs, and vegetable oil.
Bowel sounds before each feeding or, for continuous feedings, every 4 to 8 hours	To determine intestinal activity.
Correct placement of tube before feedings	To prevent aspiration of feedings.
Presence of regurgitation and feelings of fullness after feedings	May indicate delayed gastric emptying, need to decrease quantity or rate of the feeding, or high fat content of the formula.
Dumping syndrome: nausea, vomiting, diarrhea, cramps, pallor, sweating, heart palpitations, increased pulse rate, and fainting after a feeding	Clients with a jejunostomy may experience these symptoms, which result when hypertonic foods and liquids suddenly distend the jejunum. To make the intestinal contents isotonic, body fluids shift rapidly from the client's vascular system.
Abdominal distention, at least daily (Measure abdominal girth at the umbilicus.)	Abdominal distention may indicate intolerance to a previous feeding.
Diarrhea, constipation, or flatulence	The lack of bulk in liquid feedings may cause constipation. The presence of hypertonic or concentrated ingredients may cause diarrhea and flatulence.
Urine for sugar and acetone	Hyperglycemia may occur if the sugar content of the feeding is too high.
Hematocrit and urine specific gravity	Both hematocrit and urine specific gravity increase as a result of dehydration.
Serum BUN and sodium levels	Feeding formula may have a high protein content. If a high protein intake is combined with an inadequate fluid intake, the kidneys may not be able to excrete nitrogenous wastes adequately.

Before administering a tube feeding, the nurse must determine any food allergies of the client and assess tolerance to previous feedings. Table 47–5 lists essential assessments to conduct before administering tube feedings. The nurse must also check the expiration date on a commercially prepared formula or the preparation date and time of agency-prepared solution, discarding any formula that has passed the expiration date or that was prepared more than 24 hours previously.

Feedings are usually administered at room temperature unless the order specifies otherwise. The nurse warms the specified amount of solution in a basin of warm water or leaves it to stand for a while until it reaches room temperature. Because a formula that is warmed can grow microorganisms, it should not hang longer than the manufacturer recommends. Continuous-feeding formulas should be kept cold; excessive heat coagulates feedings of milk and egg, and hot liquids can irritate the mucous membranes. However, excessively cold feedings can reduce the flow of digestive juices by causing vasoconstriction and may cause cramps. Guidelines for teaching clients and families regarding administration of tube feedings in the home are found in Client Teaching.

Managing Clogged Feeding Tubes

Even if feeding tubes are flushed with water before and after feedings and medications, small-bore tubes still become clogged—especially SBFTs. This can occur when the feeding container runs dry, solid medication is not adequately crushed, or medications are mixed with formula. Even the important practice of aspirating to check residual volume increases the incidence of clogging. To avoid the necessity of

CLIENT TEACHING

Tube Feedings

Clients and caregivers need the following instructions to manage these feedings:

- *Preparation of the formula.* Include name of the formula and how much and how often it is to be given; the need to inspect the formula for expiration date and leaks and cracks in bags or cans; how to mix or prepare the formula, if needed; and aseptic techniques such as cleansing the container's top with alcohol before opening it, and changing the syringe administration set and reservoir every 24 hours.
- *Proper storage of the formula.* Include the need to refrigerate diluted or reconstituted formula and formula that contains additives.
- *Administration of the feeding.* Include proper hand cleansing technique, how to fill and hang the feeding bag, operation of an infusion pump if indicated, the feeding rate, and client positioning during and after the feeding.
- *Management of the enteral or parenteral access device.* Include site care, aseptic precautions, dressing change, as indicated, how the site should look normally, and flushing protocols (e.g., type of irrigant and schedule).
- *Daily monitoring needs.* Include temperature, weight, and intake and output.
- *Signs and symptoms of complications to report.* Include fever, increased respiratory rate, decrease in urine output, increased stool frequency or diarrhea, and altered level of consciousness.
- *Whom to contact about questions or problems.* Include emergency telephone numbers of home care agency, nursing clinician and/or primary care provider, or other 24-hour on-call emergency service.

removing the tube and reinserting a new tube, both prevention and intervention strategies must be used.

To prevent clogged feeding tubes, flush liberally (at least 30 mL water) before, between, and after each separate medication is instilled, using a 60-mL piston syringe. Too great a pressure can rupture the tube—especially small-bore feeding tubes. Do not add medications to formula or to each other because the combination could create a precipitate that clogs the tube.

Many strategies have been used to try to unclog feeding tubes. The first strategy that should be tried is to reposition the client (this may allow a kink to straighten). Alternately flush and aspirate the tube with water. Strategies that have shown inconsistent effectiveness include instilling meat tenderizer, carbonated beverages, or cranberry juice (Stepter, 2012) or flushing with small-barrel syringes. Until 2013, only enteric-coated and extended-release pancreatic enzymes were available as unclogging agents in the United States. However, an effective uncoated enzyme product, used in combination with sodium bicarbonate, is now available (Klang, Gandhi, & Mironova, 2013). Commercial de-clogging kits containing a combination of acids, buffers, antibacterial agents, enzymes, and metal inhibitors are available.

If efforts to unclog a feeding tube are unsuccessful, the tube may need to be removed. Skill 47–4 describes the steps in removing a nasogastric tube.

SKILL 47–4

Removing a Nasogastric Tube

ASSESSMENT

Assess

- For the presence of bowel sounds
- For the absence of nausea or vomiting when tube is clamped

PLANNING

DELEGATION

Due to the need for assessment of client status, the skill of removing a nasogastric tube is not delegated to UAP.

INTERPROFESSIONAL PRACTICE

Removing a nasogastric tube may be within the scope of practice for other health care providers such as PAs. Although the PA may verbally communicate their actions and plan to the health care team members, the nurse must also know where to locate their documentation in the client's health record.

Equipment

- Disposable pad or towel
- Tissues
- Clean gloves
- 50-mL syringe (optional)
- Moisture-proof trash bag

IMPLEMENTATION

Preparation

- Confirm the primary care provider's order to remove the tube.
- Assist the client to a sitting position if health permits.
- Place the disposable pad or towel across the client's chest to collect any spillage of secretions from the tube.
- Provide tissues to the client to wipe the nose and mouth after tube removal.

Removing a Nasogastric Tube—*continued*

SKILL 47–4

Performance

1. Prior to performing the removal, introduce self and verify the client's identity using agency protocol. Explain to the client what you are going to do, why it is necessary, and how he or she can participate. Discuss how the results will be used in planning further care or treatments.
2. Perform hand hygiene and observe other appropriate infection prevention procedures (e.g., clean gloves).
3. Provide for client privacy.
4. Detach the tube.
   - Apply clean gloves.
   - Disconnect the nasogastric tube from the suction apparatus, if present.
   - Unpin the tube from the client's gown.
   - Remove the adhesive tape securing the tube to the nose.
5. Remove the nasogastric tube.
   - *Optional:* Instill 50 mL of air into the tube. **Rationale:** *This clears the tube of any contents such as feeding or gastric drainage.*
   - Ask the client to take a deep breath and to hold it. **Rationale:** *This closes the glottis, thereby preventing accidental aspiration of any gastric contents.*
   - Pinch the tube with the gloved hand. **Rationale:** *Pinching the tube prevents any contents inside the tube from draining into the client's throat.*
   - Smoothly, withdraw the tube.
   - Place the tube in the trash bag. **Rationale:** *Placing the tube immediately into the bag prevents the transference of microorganisms from the tube to other articles or people.*
   - Observe the intactness of the tube.
6. Ensure client comfort.
   - Provide mouth care if desired.
   - Assist the client as required to blow the nose. **Rationale:** *Excessive secretions may have accumulated in the nasal passages.*
7. Dispose of the equipment appropriately.
   - Place the pad, bag with tube, and gloves in the receptacle designated by the agency. **Rationale:** *Correct disposal prevents the transmission of microorganisms.*
   - Remove and discard gloves.
   - Perform hand hygiene.
8. Document all relevant information.
   - Record the removal of the tube, the amount and appearance of any drainage if connected to suction, and any relevant assessments of the client.

SAMPLE DOCUMENTATION

11/8/15 1500 NG tube removed intact without difficulty. Oral & nasal care given. No bleeding or excoriation noted. Client states is hungry & thirsty. 60 mL apple juice given. No c/o nausea. ——— L. Traynor, RN

EVALUATION

- Perform a follow-up examination, such as presence of bowel sounds, absence of nausea or vomiting when tube is removed, and intactness of tissues of the nares.
- Relate findings to previous assessment data if available.
- Report significant deviations from normal to the primary care provider.

Parenteral Nutrition

Parenteral nutrition, also referred to as total parenteral nutrition (TPN) or intravenous hyperalimentation, is the IV infusion of dextrose, water, fat, proteins, electrolytes, vitamins, and trace elements. Because TPN solutions are hypertonic (highly concentrated in comparison to the solute concentration of blood), they are injected only into high-flow central veins, where they are diluted by the client's blood.

TPN is a means of achieving an anabolic state in clients who are unable to maintain a normal nitrogen balance. Such clients may include those with severe malnutrition, severe burns, bowel disease disorders (e.g., ulcerative colitis or enteric fistula), acute renal failure, hepatic failure, metastatic cancer, or major surgeries where nothing may be taken by mouth for more than 5 days.

TPN is not risk free. Infection control is of utmost importance during TPN therapy. The nurse must always observe surgical aseptic technique when changing solutions, tubing, dressings, and filters. Clients are at increased risk of fluid, electrolyte, and glucose imbalances and require frequent evaluation and modification of the TPN mixture.

TPN solutions are 10% to 50% dextrose in water, plus a mixture of amino acids and special additives such as vitamins (e.g., B complex, C, D, K), minerals (e.g., potassium, sodium, chloride, calcium, phosphate, magnesium), and trace elements (e.g., cobalt, zinc, manganese). Additives are modified to each client's nutritional needs. Fat emulsions may be given to provide essential fatty acids to correct and/or prevent essential fatty acid deficiency or to supplement the calories for clients who, for example, have high calorie needs or cannot tolerate glucose as the only calorie source. Note that 1,000 mL of 5% glucose or dextrose contains 50 grams of sugar. Thus, a liter of this solution provides less than 200 calories!

Because TPN solutions are high in glucose, infusions are started gradually to prevent hyperglycemia. The client needs to adapt to TPN therapy by increasing insulin output from the pancreas. For example, an adult client may be given 1 liter (40 mL/h) of TPN solution the first day; if the infusion is tolerated, the amount may be increased to 2 liters (80 mL/h) for 24 to 48 hours, and then to 3 liters (120 mL/h) within 3 to 5 days. Glucose levels are monitored during the infusion.

When TPN therapy is to be discontinued, the TPN infusion rates are decreased slowly to prevent hyperinsulinemia and hypoglycemia. Weaning a client from TPN may take up to 48 hours but can occur in 6 hours as long as the client receives adequate carbohydrates either orally or intravenously.

Peripheral parenteral nutrition (PPN) is delivered into the smaller peripheral veins. PPN cannot handle as concentrated a solution as central lines, but can accommodate lipids. For example, a 20% lipid emulsion can provide nearly 2,000 Kcal/day through a peripheral vein. PPN is considered to be a safe and convenient form of therapy. One major disadvantage, however, is the frequent incidence of phlebitis (vein inflammation) associated with PPN. Substituting glycerol for dextrose may reduce vein irritation (Julian, 2013). Peripheral parenteral nutrition is administered to clients whose needs for IV nutrition will last only a short time or in whom placement of a central IV catheter is contraindicated. It is a form of therapy used more frequently to *prevent* nutritional deficits than to correct them.

Enteral or parenteral feedings may be continued beyond hospital care in the client's home or may be initiated in the home.

Evaluating

The goals established in the planning phase are evaluated according to specific desired outcomes, also established in that phase. If the outcomes are not achieved, the nurse should explore the reasons. The nurse might consider the following questions:

- Was the cause of the problem correctly identified?
- Was the family included in the teaching plan? Are family members supportive?
- Is the client experiencing symptoms that cause loss of appetite (e.g., pain, nausea, fatigue)?
- Were the outcomes unrealistic for this person?
- Were the client's food preferences considered?
- Is anything interfering with digestion or absorption of nutrients (e.g., diarrhea)?

NURSING CARE PLAN Nutrition

Assessment Data	Nursing Diagnosis	Desired Outcomes*
Nursing Assessment Mrs. Rose Santini, a 59-year-old homemaker, attends a community hospital–sponsored health fair. She approaches the nutrition information booth, and the clinical specialist in nutritional support gathers a nutritional history. Mrs. Santini is very upset about her 9-kg (20-lb) weight gain. She relates to the nurse clinician that since the death of her husband 1 month ago she has lost interest in many of her usual physical and social activities. She no longer attends YMCA exercise and swimming sessions and has lost contact with her couple's bridge group. Mrs. Santini states she is bored, depressed, and very unhappy about her appearance. She has a small frame and has always prided herself on her petite figure. She says her eating habits have changed considerably. She snacks while watching TV and rarely prepares a complete meal. **Physical Examination** Height: 162.6 cm (5′4″) Weight: 66 kg (145 lb) Temperature: 37°C (98.6°F) Pulse: 76 beats/min Respirations: 16/min Blood pressure: 144/84 mmHg Triceps skinfold: 21 mm Small frame, weight in excess of 10% over ideal for height and frame **Diagnostic Data** CBC normal, urinalysis negative, chest x-ray negative, thyroid profile within normal limits	*Overweight* related to excess intake and decreased activity expenditure (as evidenced by weight gain of 9 kg (20 lb), triceps skinfold greater than normal, undesirable eating patterns)	**Weight-Loss Behavior [1627]** as evidenced by demonstrating: • Eats three meals each day that result in a 500-calorie reduction in intake. • Establishes a physical exercise plan that engages her in 15 to 20 minutes of exercise daily by day 5. • Identifies eating habits that contribute to weight gain by day 2.

Nursing Interventions*/Selected Activities	Rationale
Weight Reduction Assistance [1280]	
Determine current eating patterns by having Mrs. Santini keep a diary of what, when, and where she eats.	*Increases awareness of activities and foods that contribute to excessive intake.*
Set a weekly goal for weight loss.	*The desirable weight-loss rate is 1/2–1 kg (1–2 lb) per week.*
Encourage use of internal reward systems when goals are accomplished.	*Goal setting provides motivation, which is essential for a successful weight-loss program.*
Set a realistic plan with Mrs. Santini to include reduced food intake and increased energy expenditure.	*A combined plan of calorie reduction and exercise can enhance weight loss since exercise increases caloric utilization.*
Assist client to identify motivation for eating and internal and external cues associated with eating.	*Awareness of factors that contribute to overeating will assist the individual in planning behavior modification techniques to avoid situations that prompt excess food consumption.*
Encourage attendance at support groups for weight loss and/or refer to a community weight control program.	*Membership in a support group can enhance clients' continuation of weight-loss efforts.*
Develop a daily meal plan with a well-balanced diet, reduced calories, and reduced fat.	*Snack foods tend to be high in calories and fat and low in nutritional values.*

NURSING CARE PLAN Nutrition—*continued*

Nursing Interventions*/Selected Activities	Rationale
Nutritional Counseling [5246]	
Facilitate identification of eating behaviors to be changed.	*Increases individual's awareness of those actions that contribute to excessive intake.*
Use accepted nutritional standards to assist Mrs. Santini in evaluating adequacy of dietary intake.	*Comparing the individual's dietary history with nutritional standards will facilitate identification of nutritional deficiencies and/or excesses.*
Help Mrs. Santini to consider factors of age, past eating experiences, culture, and finances in planning ways to meet nutritional requirements.	*Social, economic, physical, and psychological factors play a role in nutrition and/or malnutrition.*
Discuss Mrs. Santini's knowledge of the basic food groups, as well as perceptions of the needed diet modification.	*Helps to determine the client's knowledge base and identify misconceptions and/or gaps in understanding.*
Discuss food likes and dislikes.	*Incorporating Mrs. Santini's food preferences into the dietary plan will promote adherence to the weight-loss program.*
Assist Mrs. Santini in stating her feelings and concerns about goal achievement.	*Fear of success, failure, or other concerns may block goal achievement.*
Behavior Modification [4360]	
Assist Mrs. Santini to identify strengths and reinforce these.	*Reinforcing strengths enhances self-esteem and encourages the individual to draw on these assets during the weight-loss program.*
Encourage her to examine her own behavior.	*Involving Mrs. Santini in self-appraisal will promote identification of behaviors that may be contributing to excessive caloric intake.*
Identify the behavior to be changed in specific, concrete terms (e.g., stop snacking in front of the TV).	*Identification of specific behaviors is essential for planning behavior modification.*
Consider that it is easier to increase a behavior than to decrease a behavior (e.g., increase activities or hobbies that involve the hands such as sewing versus decreasing TV snacking).	*Habitual behaviors are difficult to change. Breaking old habits may be easier if viewed from the standpoint of increasing an enjoyable, healthy activity.*
Choose reinforcers that are meaningful to Mrs. santini.	*Positive reinforcement is not likely to be an effective part of behavior modification if the reinforcer is meaningless to the individual.*

Evaluation

Outcome met. Mrs. Santini kept a dietary log for 5 days and has eaten balanced meals each day, resulting in a daily deficit of 400 to 500 calories. She is aware that she eats excessively because she is bored and depressed. She has reestablished her former social contacts including her church bridge club. Mrs. Santini has purchased a stationary bicycle and exercises 20 minutes daily. She enrolled in a knitting class that meets two nights per week. She has lost 2/3 kg (1 1/2 lb) in the past week. As a reward, Mrs. Santini renewed her membership to the YMCA.

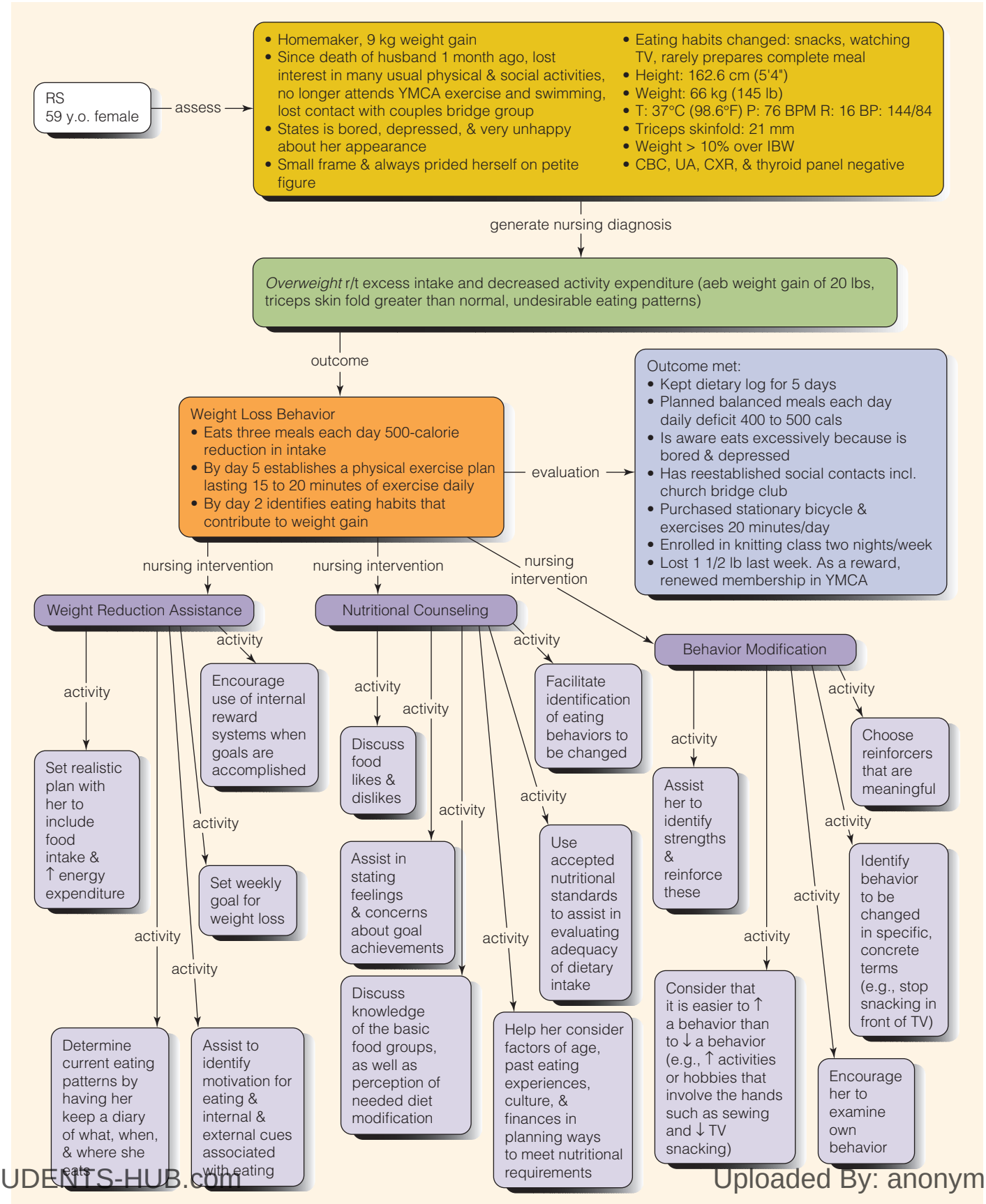
*The NOC # for desired outcomes and the NIC # for nursing interventions are listed in brackets following the appropriate outcome or intervention. Outcomes, interventions, and activities selected are only a sample of those suggested by NOC and NIC and should be further individualized for each client.

Applying Critical Thinking

1. How do Mrs. Santini's personal characteristics influence her nutritional needs?
2. What further information do you need regarding Mrs. Santini's present diet?
3. Offer suggestions for ways to modify Mrs. Santini's tendency to snack.
4. Mrs. Santini asks what her weight should be. How do you respond?

See Critical Thinking Possibilities on student resource website.

CONCEPT MAP
Nutrition



Chapter 47 Review

CHAPTER HIGHLIGHTS

- Essential nutrients are grouped into categories: carbohydrates, proteins, lipids, vitamins, and minerals.
- Nutrients serve three basic purposes: forming body structures (such as bones and blood), providing energy, and helping to regulate the body's biochemical reactions.
- The amount of energy that nutrients or foods supply to the body is their caloric value. The basal metabolic rate (BMR) is the rate at which the body metabolizes food to maintain the energy and requirements of a person who is awake and at rest. The amount of energy required to maintain basic body functions is referred to as the resting energy expenditure (REE).
- A person's state of energy balance can be determined by comparing caloric intake with caloric expenditure.
- Ideal body weight (IBW) is the optimal weight recommended for optimal health.
- Body mass index (BMI) and percent body fat are indicators of changes in body fat stores. They indicate whether a person's weight is appropriate for height and may provide a useful estimate of nutrition.
- Factors influencing a person's nutrition include development, gender, ethnicity and culture, beliefs about foods, personal preferences, religious practices, lifestyle, economics, medications and therapy, health, alcohol consumption, advertising, and psychological factors.
- Nutritional needs vary considerably according to age, growth, and energy requirements. Adolescents have high energy requirements due to their rapid growth; a diet plentiful in milk, meats, green and yellow vegetables, and fresh fruits is required. Middle-aged adults and older adults often need to reduce their caloric intake because of decreases in metabolic rate and activity levels.
- Various daily food guides have been developed to help healthy people meet the daily requirements of essential nutrients and to facilitate meal planning. These include the *Dietary Guidelines for Americans* and the Food Guide Pyramid/MyPlate.
- Both inadequate and excessive intakes of nutrients result in malnutrition. The effects of malnutrition can be general or specific, depending on which nutrients and what level of deficiency or excess are involved.
- Assessment of nutritional status may involve all or some of the following: nutritional screening, nursing history data, anthropometric measurements, biochemical (laboratory) data, clinical data (physical examination), calculation of the percentage of weight loss, and a dietary history.
- Nursing diagnoses for clients with nutritional problems may be broadly stated as *Imbalanced Nutrition: Less Than Body Requirements* or *Overweight.* Because nutritional problems may affect many other areas of human functioning, a nutritional problem may be the etiology of other diagnoses, such as *Activity Intolerance* and *Low Self-Esteem.*
- Major goals for clients with or at risk for nutritional problems include the following: Maintain or restore optimal nutritional status, decrease or regain specified weight, promote healthy nutritional practices, and prevent complications associated with malnutrition.
- Assisting clients and support persons with therapeutic diets is a function shared by the nurse and the dietitian. The nurse reinforces the dietitian's instructions, assists the client to make beneficial changes, and evaluates the client's response to planned changes.
- Because many hospitalized clients have poor appetites, a major responsibility of the nurse is to provide nursing interventions that stimulate their appetites.
- Whenever possible, the nurse should help incapacitated clients to feed themselves; a number of self-feeding aids help clients who have difficulty handling regular utensils.
- The nurse can refer clients to various community programs that help special subgroups of the population meet their nutritional needs.
- Enteral feedings, administered through nasogastric, nasointestinal, gastrostomy, or jejunostomy tubes, are provided when the client is unable to ingest foods or the upper GI tract is impaired.
- A nasogastric or nasointestinal tube is used to provide enteral nutrition for short-term use. A gastrostomy or jejunostomy tube can be used to supply nutrients via the enteral route for long-term use.
- The two most accurate methods of confirming GI tube placement are radiographs and pH testing of aspirate.
- Parenteral nutrition, provided when oral intake is insufficient or unadvisable, is given intravenously into a large central vein (e.g., the superior vena cava).

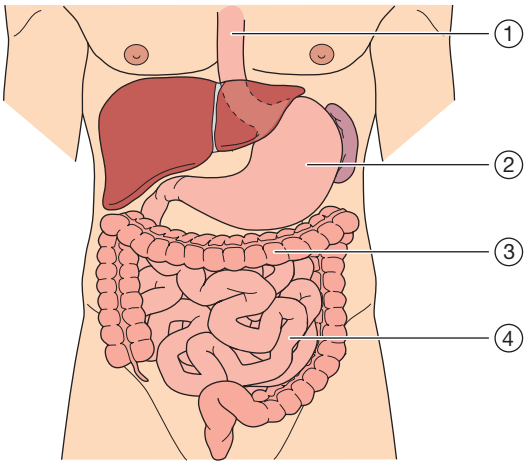
TEST YOUR KNOWLEDGE

1. Which of the following nursing diagnoses is most appropriate for a client with a body mass index (BMI) of 35?
   1. *Imbalanced Nutrition: Less Than Body Requirements*
   2. *Obesity*
   3. *Overweight*
   4. *Deficient Knowledge*

2. An adult reports usually eating the following each day: 3 cups dairy, 2 cups fruit, 2 cups vegetables, 5 ounces grains, and 5 ounces meat. The nurse would counsel the client to:
   1. Maintain the diet; the servings are adequate.
   2. Increase the number of servings of dairy.
   3. Decrease the number of servings of vegetables.
   4. Increase the number of servings of grains.

3. Which of the following are allowed on a full liquid diet? Select all that apply.
   _____ 1. Scrambled eggs
   _____ 2. Chocolate pudding
   _____ 3. Tomato juice
   _____ 4. Hard candy
   _____ 5. Mashed potatoes
   _____ 6. Cream of Wheat cereal
   _____ 7. Oatmeal cereal
   _____ 8. Fruit "smoothies"

4. What is the best indication of proper placement of a nasogastric tube in the stomach?
   1. Client is unable to speak.
   2. Client gags during insertion.
   3. pH of the aspirate is less than 5.
   4. Fluid is easily instilled into the tube.
5. What is the proper technique with gravity tube feeding?
   1. Hang the feeding bag 1 foot higher than the tube's insertion point into the client.
   2. Administer the next feeding only if there is less than 25 mL of residual volume from the previous feeding.
   3. Place client in the left lateral position.
   4. Administer feeding directly from the refrigerator.
6. A 55-year-old female is about 9 kg (20 lb) over her desired weight. She has been on a "low-calorie" diet with no improvement. Which statement reflects a healthy approach to the desired weight loss? "I need to:
   1. Increase my exercise to at least 30 minutes every day."
   2. Switch to a low-carbohydrate diet."
   3. Keep a list of my forbidden foods on hand at all times."
   4. Buy more organic and less processed foods."
7. An older Asian client has mild dysphagia from a recent stroke. The nurse plans the client's meals based on the need to:
   1. Have at least one serving of thick dairy (e.g., pudding, ice cream) per meal.
   2. Eliminate the beer usually ingested every evening.
   3. Include as many of the client's favorite foods as possible.
   4. Increase the calories from lipids to 40%.
8. Two months ago a client weighed 195 pounds. The current weight is 182 pounds. Calculate the client's percentage of weight loss and determine its significance.
   1. % weight loss
   2. Not significant
   3. Significant weight loss
   4. Severe weight loss
9. Which of the sites on the diagram below indicates the correct location for the tip of a small-bore nasally placed feeding tube?



Gastrointestinal tract

10. Which of the following meals would the nurse recommend to the client as highest in calcium, iron, and fiber?
    1. 3 ounces cottage cheese with 1/3 cup raisins and 1 banana
    2. 1/2 cup broccoli with 3 ounces chicken and 1/2 cup peanuts
    3. 1/2 cup spaghetti with 2 ounces ground beef and 1/2 cup lima beans plus 1/2 cup ice cream
    4. 3 ounces tuna plus 1 ounce cheese sandwich on whole-wheat bread plus a pear

See Answers to Test Your Knowledge in Appendix A.

READINGS AND REFERENCES

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