Manufacturers can use structure-function claims without FDA authorization. They base their claims on their review and interpretation of the scientific literature. Like all label claims, structure-function claims must be true and not misleading. Structure-function claims are easy to spot because, on the label, they must be accompanied with the disclaimer “This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.”

Manufacturers who plan to use a structure-function claim on a particular product must inform the FDA of the use of the claim no later than 30 days after the product is first marketed. While the manufacturer must be able to substantiate its claim, it does not have to share the substantiation with the FDA or make it publicly available. If the submitted claims promote the products as drugs instead of supplements, the FDA can advise the manufacturer to change or delete the claim.

Because there often is a fine line between disease claims and structure-function claims, the FDA has established criteria under which a label claim would or would not qualify as a disease claim. Among label factors are these:

1. The naming of a specific disease or class of diseases
2. The use of scientific or lay terminology to describe the product’s effect on one or more signs or symptoms recognized by healthcare professionals and consumers as characteristic of a specific disease or a number of different specific diseases
3. Product name
4. Statements about product formulation
5. Citations or references that refer to disease
6. Use of the words disease or diseased
7. Art, such as symbols and pictures
8. Statements that the product can substitute for an approved therapy (for example, a drug)

If shoppers find dietary supplements whose labels state or imply that the product can help diagnose, treat, cure, or prevent a disease (for example, “cures cancer” or “treats arthritis”), they should realize that the product is being marketed illegally as a drug and as such has not been evaluated for safety or effectiveness.

The FTC regulates claims made in the advertising of dietary supplements, and in recent years, that agency has taken a number of enforcement actions against companies whose advertisements contained false and misleading information. The actions targeted, for example, erroneous claims that chromium picolinate was a treatment for weight loss and high blood cholesterol. An action in 1997 targeted ads for an ephedrine alkaloid supplement because they understated the degree of the product’s risk and featured a man falsely described as a doctor.

**PROGRESS CHECK ON ACTIVITY 1**

**FILL-IN**

1. The label of a dietary supplement should include:
   a. 
   b. 
   c. 
   d. 
   e. 
   f. 

2. Under the DSHEA and previous food labeling laws, supplement manufacturers are allowed to use, when appropriate, which three types of claims:
   a. 
   b. 
   c. 

3. Labels of dietary supplement include two portions:
   a. 
   b. 

**MULTIPLE CHOICE**

Circle the letter of the correct answer.

4. An official compendium applicable to dietary supplements can be which of the following:
   a. U.S. Pharmacopeia
   b. Homeopathic Pharmacopeia of the United States
   c. National Formulary
   d. All of the above

5. A supplement that carries the claim “high in calcium” should have, per serving, at least:
   a. 100 milligrams of calcium
   b. 200 milligrams of calcium
   c. 400 milligrams of calcium

**TRUE/FALSE**

Circle T for True and F for False.

6. T F The FDA is authorized to test dietary supplements.

7. T F Under the DSHEA, firms cannot make statements about classical nutrient deficiency diseases—even though these statements disclose the prevalence of the disease in the United States.
Folate or Folic Acid

For basic information on this vitamin, consult Chapter 5. The information in this activity has been modified from fact sheets distributed by the Office of Dietary Supplements, National Institutes of Health.

Folate and folic acid are forms of a water-soluble B vitamin. Folate occurs naturally in food. Folic acid is the synthetic form of this vitamin that is found in supplements and fortified foods. Folate gets its name from the Latin word folium for leaf. A key observation of researcher Lucy Wills nearly 70 years ago led to the identification of folate as the nutrient needed to prevent the anemia of pregnancy. Dr. Wills demonstrated that the anemia could be corrected by a yeast extract. Folate was identified as the corrective substance in yeast extract in the late 1930s and was extracted from spinach leaves in 1941. Folate is necessary for the production and maintenance of new cells. This effect is especially important during periods of rapid cell division and growth such as infancy and pregnancy. Folate is needed to make DNA and RNA, the building blocks of cells. It also helps prevent changes to DNA that may lead to cancer.

Both adults and children need folate to make normal red blood cells and prevent anemia. Leafy greens such as spinach and turnip greens, dry beans and peas, fortified cereals and grain products, and some fruits and vegetables are rich food sources of folate. Some breakfast cereals (ready-to-eat and others) are fortified with 25% or 100% of the Daily Value (DV) for folic acid.

NEED FOR EXTRA FOLIC ACID

Women of childbearing age, people who abuse alcohol, anyone taking anticonvulsants or other medications that interfere with the action of folate, individuals diagnosed with anemia from folate deficiency, and individuals with malabsorption, liver disease, or who are receiving kidney dialysis treatment may benefit from a folic acid supplement. Folic acid is very important for all women who may become pregnant. Adequate folate intake during the periconceptual period, the time just before and just after a woman becomes pregnant, protects against a number of congenital malformations including neural tube defects. Neural tube defects result in malformations of the spine (spina bifida), skull, and brain (anencephaly). The risk of neural tube defects is significantly reduced when supplemental folic acid is consumed in addition to a healthful diet prior to and during the first month following conception. Women who could become pregnant are advised to eat foods fortified with folic acid or take supplements in addition to eating folate-rich foods to reduce the risk of some serious birth defects. Taking 400 micrograms of synthetic folic acid daily from fortified foods and/or supplements has been suggested.

VITAMIN B12 AND FOLIC ACID

Folic acid supplements can correct the anemia associated with vitamin B12 deficiency. Unfortunately, folic acid will not correct changes in the nervous system that result from vitamin B12 deficiency. Permanent nerve damage can occur if vitamin B12 deficiency is not treated. Intake of supplemental folic acid should not exceed 1000 micrograms (mcg) per day to prevent folic acid from masking symptoms of vitamin B12 deficiency. It is very important for older adults to be aware of the relationship between
Folic acid and vitamin $B_{12}$ because they are at greater risk of having a vitamin $B_{12}$ deficiency. Persons 50 years of age or older should ask their physicians to check $B_{12}$ status before taking a supplement that contains folic acid.

FOLIC ACID, HEART DISEASE, AND CANCER

A deficiency of folate, vitamin $B_{12}$, or vitamin $B_6$ may increase the level of homocysteine, an amino acid normally found in your blood. There is evidence that an elevated homocysteine level is an independent risk factor for heart disease and stroke. The evidence suggests that high levels of homocysteine may damage coronary arteries or make it easier for blood clotting cells called platelets to clump together and form a clot. However, there is currently no evidence available to suggest that lowering homocysteine with vitamins will reduce the risk of heart disease. Clinical intervention trials are needed to determine whether supplementation with folic acid, vitamin $B_{12}$, or vitamin $B_6$ can lower the risk of developing coronary heart disease.

Some evidence associates low blood levels of folate with a greater risk of cancer. Folate is involved in the synthesis, repair, and functioning of DNA, our genetic map, and a deficiency of folate may result in damage to DNA that may lead to cancer. Several studies have associated diets low in folate with increased risk of breast, pancreatic, and colon cancer. Findings from a study of over 121,000 nurses suggested that long-term folic acid supplementation (for 15 years) was associated with a decreased risk of colon cancer in women aged 55 to 69 years of age. However, associations between diet and disease do not indicate a direct cause. Researchers are continuing to investigate whether enhanced folate intake from foods or folic acid supplements may reduce the risk of cancer. Until results from such clinical trials are available, folic acid supplements should not be recommended to reduce the risk of cancer.

FOLIC ACID AND METHOTREXATE FOR CANCER

Folate is important for cells and tissues that rapidly divide. Cancer cells divide rapidly, and drugs that interfere with folate metabolism are used to treat cancer. Methotrexate is a drug often used to treat cancer because it limits the activity of enzymes that need folate. Unfortunately, methotrexate can be toxic, producing side effects such as inflammation in the digestive tract that make it difficult to eat normally. Leucovorin is a form of folate that can help “rescue” or reverse the toxic effects of methotrexate. It is not known whether folic acid supplements can help control the side effects of methotrexate without decreasing its effectiveness in chemotherapy. It is important for anyone receiving methotrexate to follow a medical doctor’s advice on the use of folic acid supplements.

FOLIC ACID AND METHOTREXATE FOR NONCANCEROUS DISEASES

Low-dose methotrexate is used to treat a wide variety of noncancerous diseases such as rheumatoid arthritis, lupus, psoriasis, asthma, sarcoidosis, primary biliary cirrhosis, and inflammatory bowel disease. Low doses of methotrexate can deplete folate stores and cause side effects that are similar to folate deficiency. Both high-folate diets and supplemental folic acid may help reduce the toxic side effects of low-dose methotrexate without decreasing its effectiveness. Anyone taking low-dose methotrexate for the health problems listed here should consult with a physician about the need for a folic acid supplement.

HEALTH RISK

The risk of toxicity from folic acid is low. The Institute of Medicine has established a tolerable upper intake level (UL) for folate of 1000 mcg for adult men and women, and a UL of 800 mcg for pregnant and lactating (breastfeeding) women less than 18 years of age. Supplemental folic acid should not exceed the UL to prevent folic acid from masking symptoms of vitamin $B_{12}$ deficiency.

TRUE/FALSE

1. T F Folate and folic acid are forms of a fat-soluble B vitamin.
2. T F Folate does not occur naturally in food.
3. T F Folate was identified as the corrective substance in yeast extract in the late 1930s and was extracted from spinach leaves in 1941.
4. T F Folate is Folic acid is not needed to make DNA and RNA, the building blocks of cells, but it helps prevent changes to DNA that may lead to cancer.
5. T F Breakfast cereals (ready-to-eat and others) are required to be fortified with folic acid.
6. T F Folic acid is only important for all women who may become pregnant.
7. T F The risk of neural tube defects is significantly reduced when supplemental folic acid is consumed in addition to a healthful diet prior to and during the first month following conception.
8. T F Folic acid supplements can correct the anemia associated with vitamin $B_{12}$ deficiency but not correct changes in the nervous system that result from vitamin $B_{12}$ deficiency.
9. T F Intake of supplemental folic acid should not exceed 1000 micrograms (mcg) per day to prevent folic acid from masking symptoms of vitamin $B_{12}$ deficiency.
10. T F There is evidence that an elevated homocysteine level is a dependent risk factor for heart disease and stroke.

11. T F Folic acid supplements can help control the side effects of methotrexate without decreasing its effectiveness in chemotherapy.

12. T F Low doses of methotrexate can deplete folate stores and cause side effects that are similar to folate deficiency.

13. T F A megadose of folic acid may be toxic.

FILL-IN
14. List seven groups of people who may benefit from folic acid supplementation.
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
   e. ____________________________
   f. ____________________________
   g. ____________________________

15. Neural tube defects caused by folate deficiency result in malformations of the:
   a. ____________________________
   b. ____________________________
   c. ____________________________

16. The recommended daily intake of folic acid either from fortified foods and/or supplemented (synthetic) folic acid is ____________________________

ACTIVITY 3:
Kava Kava, Ginkgo Biloba, Goldenseal, Echinacea, Comfrey, and Pulegone

Currently, there are thousands of botanicals being sold as dietary supplements. This chapter is not the proper forum to discuss all of them. Rather, six popular ones are discussed here. To make sure that the information is based on science and not testimony, the data have been derived from the following government documents:
1. National Institutes of Health, Office of Dietary Supplements
2. National Institutes of Health, National Toxicology Program
3. National Institutes of Health, National Institute of Aging

The six commercial dietary supplements discussed in this activity are kava kava, Ginkgo biloba, goldenseal, echinacea, comfrey, and pulegone.

KAVA KAVA

On March 25, 2002, the Food and Drug Administration (FDA) issued the following warning:

The FDA is advising consumers of the potential risk of severe liver injury associated with the use of kava-containing dietary supplements. Kava *Piper methysticum* is a plant indigenous to the islands in the South Pacific where it is commonly used to prepare a traditional beverage. Supplements containing the herbal ingredient kava are promoted for relaxation (e.g., to relieve stress, anxiety, and tension), sleeplessness, menopausal symptoms, and other uses. The FDA has not made a determination about the ability of kava dietary supplements to provide such benefits.

Liver-related risks associated with the use of kava have prompted regulatory agencies in other countries, including those in Germany, Switzerland, France, Canada, and the United Kingdom, to take action ranging from warning consumers about the potential risks of kava use to removing kava-containing products from the marketplace. Although liver damage appears to be rare, the FDA believes consumers should be informed of this potential risk.

Kava-containing products have been associated with liver-related injuries—including hepatitis, cirrhosis, and liver failure—in over 25 reports of adverse events in other countries. Four patients required liver transplants. In the United States, the FDA has received a report of a previously healthy young female who required liver transplantation, as well as several reports of liver-related injuries.

Given these reports, people who have liver disease or liver problems, or people who are taking drug products that can affect the liver, should consult a physician before using kava-containing supplements.

Consumers who use a kava-containing dietary supplement and who experience signs of illness associated with liver disease should also consult their physician. Symptoms of serious liver disease include jaundice (yellowing of the skin or whites of the eyes) and brown urine. Nonspecific symptoms of liver disease can include nausea, vomiting, light-colored stools, unusual tiredness, weakness, stomach or abdominal pain, and loss of appetite.

The FDA urges consumers and their healthcare professionals to report any cases of liver and other injuries that may be related to the use of kava-containing dietary supplements. Adverse events associated with the use of dietary supplements should be reported as soon as possible.
The presence of kava in a supplement should be identified on the product label in the Supplement Facts box. The following are commonly used names for kava:

- ava
- ava pepper
- awa
- intoxicating pepper
- kava
- kava kava
- kava pepper
- kava root
- kava-kava
- kawa
- kawa-kawa
- kawa-kawa
- kew
- *Piper methysticum*
- *Piper methysticum* Forst.f.
- rauschpfeffer
- sakau
- tonga
- wurzelstock
- yangona

The FDA will continue to investigate the relationship, if any, between the use of dietary supplements containing kava and liver injury. The agency’s investigation includes attempting to determine a biological explanation for the relationship and to identify the different sources of kava in the United States and Europe. The agency will alert consumers, and if warranted, take additional action as more information becomes available.

**GINKGO BILOBA**

**Introduction**

*Ginkgo biloba*, a readily available natural product, has been the focus of recent media reports as a potential treatment for Alzheimer’s disease. Although a 1997 study in the United States suggests that a ginkgo extract may be of some help in treating the symptoms of Alzheimer’s disease and vascular dementia, there is no evidence that *Ginkgo biloba* will cure or prevent Alzheimer’s disease.

In addition, some recent case studies imply that daily use of *Ginkgo biloba* extracts may cause side effects, such as excessive bleeding, especially when combined with daily use of aspirin. Much more research is needed before scientists will know whether and how *Ginkgo biloba* extracts benefit people.

**Research Outside of the United States**

For centuries, extracts from the leaves of the ginkgo tree have been used as Chinese herbal medicine to treat a variety of medical conditions. In Europe and some Asian countries, standardized extracts from ginkgo leaves are taken to treat a wide range of symptoms, including dizziness, memory impairment, inflammation, and reduced blood flow to the brain and other areas of impaired circulation. Because *Ginkgo biloba* is an antioxidant, some claims have been made that it can be used to prevent damage caused by free radicals (harmful oxygen molecules). Although Germany recently approved ginkgo extracts (240 mg a day) to treat Alzheimer’s disease, there is not enough information to recommend its broad use.

**Research in the United States**

Researchers at the New York Institute for Medical Research in Tarrytown, New York, conducted the first clinical study of *Ginkgo biloba* and dementia in the United States. Their findings were published in the *Journal of the American Medical Association* (October 22/29, 1997). These scientists examined how taking 120 mg a day of a *Ginkgo biloba* extract affected the rate of cognitive decline in people with mild to moderately severe dementia caused by Alzheimer’s disease and vascular dementia. At the end of the study, they reported a small treatment difference in people given the *Ginkgo biloba* extract.

Three tests were used to measure changes in the condition of participants. First, participants showed a slight improvement on a test that measured their cognitive function (mental processes of knowing, thinking, and learning). Second, participants showed a slight improvement on a test that measured social behavior and mood changes that were observed by their caregivers. Third, participants showed no improvement on a doctor’s assessment of change test.

Because 60% of the people did not complete the study, findings are difficult to interpret and may even be distorted. In addition, this study did not address the effect of *Ginkgo biloba* on delaying or preventing the onset of Alzheimer’s disease or vascular dementia. The researchers recommend more investigation to accomplish the following: determine if these findings are valid, understand how *Ginkgo biloba* works on brain cells, and identify an effective dosage and potential side effects.

The extract of the ginkgo leaf contains a balance of flavone glycosides (including one suspected high-dose carcinogen, quercetin) and terpene lactones. Other claims are as follows: Ginkgo acts as a blood thinner; it improves circulation and is therefore used to treat migraine headaches, depression, and a range of lung and heart problems.

People should consult with their family doctors before using *Ginkgo biloba* extracts. This recommendation is especially true for those with disorders in blood circulation or blood clotting and those taking anticoagulants such as aspirin. Many different preparations of *Ginkgo*


**COMFREY**

Certain dietary supplements contain the herbal ingredient comfrey *Symphytum officinale* (common comfrey), *S. asperum* (prickly comfrey), and *S. x uplandicum* (Russian comfrey). Claims have been made about comfrey.

**ECHINACEA**

This member of the daisy family is one of the top medicinal herb sellers in the United States. Although once used for everything from snakebites to typhoid, echinacea as a dietary supplement is most commonly used today as an immunostimulant to treat the common cold, sore throat, and flu. Echinacea is not known to have any serious adverse side effects, although there have been reports of skin rash and insomnia among users. The herb is available in many forms—dried root or leaf, liquid extract, powder, capsules, tablets, creams, gels, and injections (outside of North America). It has yet to be determined how echinacea is best administered or exactly how—or if—the plant’s complex mixture of polysaccharides, flavonoids, essential oils, and other compounds actually produces beneficial effects. Again, this dietary supplement is being studied for its clinical effect and safety.

**GOLDENSEAL**

The root of the goldenseal plant is traditionally used to treat wounds, ulcers, digestive problems, and eye and ear infections. Today, the herb is also used as a laxative, tonic, and diuretic. Goldenseal is used in feminine products such as vaginal douches and is claimed to help with menstrual disorders such as irregular cycle and excessive bleeding. Berberine, one of the chief active components in goldenseal, has antimicrobial and vasodilatory properties and may also be effective in preventing the growth of cancer cells. The other major component of goldenseal, hydrastine (which can be made from berberine), has abortifacient effects and has been shown to induce labor in pregnant women when taken orally. Large internal doses of goldenseal may cause convulsions and irritation of the mouth, throat, and stomach, tingling of the skin, paralysis, respiratory failure, and possibly death at very high doses. Chronic use may inhibit vitamin B absorption.

At present goldenseal is being studied by the federal health authorities and clinical experts to determine its effectiveness, safety, and toxicology.

**GINKGO BILoba**

Extract are available over the counter. They vary in content and active ingredients. Because not enough research has been done, no specific daily amount of a Ginkgo *biloba* extract can be recommended as safe or effective at this time.

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Certain dietary supplements contain the herbal ingredient comfrey *Symphytum officinale* (common comfrey), *S. asperum* (prickly comfrey), and *S. x uplandicum* (Russian comfrey). Claims have been made about comfrey.

Applied externally, comfrey acts as an anti-inflammatory to promote healing of bruises, sprains, and open wounds. The roots and leaves of the plant contain the protein allantoin, which stimulates cell proliferation. Comfrey is said to help wounds to heal and broken bones to knit. It is also taken internally as an herbal tea to treat gastric ulcers, rheumatic pain, arthritis, bronchitis, and colitis. This ingestion is a matter of some concern because comfrey contains several pyrrolizidine alkaloids, primarily symphytine, which have been linked to liver and lung cancer in rats. The hepatotoxic effects of pyrrolizidine alkaloids are well established in both animals and humans.

The use of comfrey in dietary supplements is a serious concern to the FDA. These plants contain pyrrolizidine alkaloids, substances that are firmly established to be hepatotoxins in animals. Reports in the scientific literature clearly associate oral exposure of comfrey and pyrrolizidine alkaloids with the occurrence of veno-occlusive disease (VOD) in animals. Moreover, outbreaks of hepatic VOD have been reported in other countries over the years, and the toxicity of these substances in humans is generally accepted. The use of products containing comfrey has also been implicated in serious adverse incidents over the years in the United States and elsewhere. However, while information is generally lacking to establish a cause-effect relationship between comfrey ingestion and observed adverse effects in humans, the adverse effects that have been seen are entirely consistent with the known effects of comfrey ingestion that have been described in the scientific literature. The pyrrolizidine alkaloids that are present in comfrey, in addition to being potent hepatotoxins, have also been shown to be toxic to other tissues as well. There is also evidence that implicates these substances as carcinogens. Taken together, the clear evidence of an association between oral exposure to pyrrolizidine alkaloids and serious adverse health effects and the lack of any valid scientific data that would enable the agency to determine whether there is an exposure, if any, that would present no harm to consumers, indicates that this substance should not be used as an ingredient in dietary supplements.

Since 2000, the position of the FDA is as follows:

1. The FDA believes that the available scientific information is sufficient to firmly establish that dietary supplements that contain comfrey or any other source of pyrrolizidine alkaloids are adulterated under the act.
2. The FDA strongly recommends that firms marketing a product containing comfrey or another source of pyrrolizidine alkaloids remove the product from the market and alert its customers to immediately stop using the product.
3. The FDA is prepared to use its authority and resources to remove products from the market that appear to violate the act.
4. The FDA believes that manufacturers need to take adequate steps to identify and report adverse events, especially adverse events that may include liver disorders, associated with any product that has an ingredient that may contain pyrrolizidine alkaloids.

Further, since 2000, the Federal Trade Commission (FTC) has also taken action against unsafe products containing comfrey. The FTC is against the marketing of any comfrey-containing product intended for internal use or use on open wounds and requires a warning on comfrey products marketed for external uses.

PULEGONE

Pulegone is the active ingredient in pennyroyal and is also found in several other species of mint. Pennyroyal is traditionally used as a carminative, insect repellent, emmenagogue, and abortifacient. Prior studies have demonstrated hepatic, renal, and pulmonary toxicity in humans, as well as central nervous system toxicity resulting in seizure, coma, and death. Pulegone is toxic to the developing fetus.

**Progress Check on Activity 3**

**Fill-in**

1. Name five commercial dietary supplements:
   a. ___________________________
   b. ___________________________
   c. ___________________________
   d. ___________________________
   e. ___________________________

2. Name five commonly used names for *Piper methyleticum*:
   a. ___________________________
   b. ___________________________
   c. ___________________________
   d. ___________________________
   e. ___________________________

**True/False**

Circle T for True and F for False.

3. T F Kava has been used by Pacific islanders for centuries. Therefore kava-containing supplements have no side effects.

4. T F Supplements containing kava are effective for relaxation, sleeplessness, and menopausal symptoms.

5. T F Dietary supplements are considered as safe by manufacturers. Therefore, consumers do not need to consult a physician before using them.

6. T F *Ginkgo biloba* is effective in preventing Alzheimer’s disease.

7. T F Daily use of *Ginkgo biloba* extracts is safe when used with other medications.

8. T F *Ginkgo biloba* is an antioxidant, and can prevent damage caused by free radicals.

9. T F Taking 120 mg a day of a *Ginkgo biloba* extract may affect the rate of cognitive decline in people with mild to moderately severe dementia caused by Alzheimer’s disease and vascular dementia.

10. T F Goldenseal root should not be taken by pregnant women.

11. T F Goldenseal root has antimicrobial properties and is therefore useful in treating eye and ear infections.

12. T F Echinacea as a dietary supplement is most commonly used today as an immunostimulant to treat the common cold, sore throat, and flu.

13. T F Comfrey is safe when it is used for external treatment of wounds.

14. T F The main pyrrolizidine alkaloid in comfrey, symphytine, is hepatotoxic and carcinogenic.

15. T F Ingestion of pennyroyal can be fatal as it affects the central nervous system resulting in seizure and coma.

16. T F Pennyroyal should not be taken by pregnant women as it is toxic to a developing fetus.

**Activity 4:**

**An Example of Side Effects from Medications for Hyperactivity**

In the March-April 2002 issue of the *FDA Consumer* magazine, the FDA published an article titled “Tips for the savvy supplement user: Making informed decisions.” A slightly modified version is presented here.

The choice to use a dietary supplement can be a wise decision that provides health benefits. However, under certain circumstances, these products may be unnecessary for good health, or they may even create unexpected risks.

Clearly, people choosing to supplement their diets with herbals, vitamins, minerals, or other substances want to know more about the products they choose so that they can make informed decisions about them. Given the abundance and conflicting nature of information now available about dietary supplements, you may need help to sort the reliable information from the questionable. The FDA has prepared these tips and resources to help you become a savvy dietary supplement user. The principles underlying these tips are similar to those principles a savvy consumer would use for any product.
Do I need to think about my total diet?

Yes. Dietary supplements are intended to supplement the diets of some people but not to replace the balance of the variety of foods important to a healthy diet. While you need enough nutrients, too much of some nutrients can cause problems. You can find information on the functions and potential benefits of vitamins and minerals, as well as upper safe limits for nutrients from many nonprofit organizations such as government agencies (e.g., the FDA), university extension offices, American Dietetic Association, and so on, including Chapters 3 to 7 in this book.

Should I check with my doctor or healthcare provider before using a supplement?

This is a good idea, especially for certain population groups. Dietary supplements may not be risk-free under certain circumstances:

- If you are pregnant, nursing a baby, or have a chronic medical condition, such as diabetes, hypertension or heart disease, be sure to consult your doctor or pharmacist before purchasing or taking any supplement.
- While vitamin and mineral supplements are widely used and generally considered safe for children, you may wish to check with your doctor or pharmacist before giving these or any other dietary supplements to your child.
- If you plan to use a dietary supplement in place of drugs or in combination with any drug, tell your healthcare provider first. Many supplements contain active ingredients that have strong biological effects, and their safety is not always assured in all users.
- If you have certain health conditions and take these products, you may be placing yourself at risk.
- Some supplements may interact with prescription and over-the-counter (OTC) medicines. Taking a combination of supplements or using these products together with medications (whether prescription or OTC drugs) could, under certain circumstances, produce adverse effects, some of which could be life threatening.

Be alert to advisories about these products, whether taken alone or in combination. For example, Coumadin (a prescription medicine), Ginkgo biloba (an herbal supplement), aspirin (an OTC drug), and vitamin E (a vitamin supplement) can each thin the blood and taking any of these products together can increase the potential for internal bleeding. Combining St. John’s-wort with certain HIV drugs significantly reduces their effectiveness. St. John’s-wort may also reduce the effectiveness of prescription drugs for heart disease, depression, seizures, certain cancers, or oral contraceptives.

Some supplements can have unwanted effects during surgery. It is important to fully inform your doctor about the vitamins, minerals, herbs, or any other supplements you are taking, especially before elective surgery. You may be asked to stop taking these products at least 2 to 3 weeks ahead of the procedure to avoid potentially dangerous supplement/drug interactions—such as changes in heart rate and blood pressure or increased bleeding—that could adversely affect the outcome of your surgery.

Who is responsible for ensuring the safety and efficacy of dietary supplements?

Under the law, manufacturers of dietary supplements are responsible for making sure their products are safe before they go to market. Manufacturers are also responsible for determining that the claims on their labels are accurate and truthful. Dietary supplement products are not reviewed by the government before they are marketed, but the FDA can take action against any unsafe dietary supplement product that reaches the market. If the FDA can prove that claims on marketed dietary supplement products are false and misleading, the agency may take action against these products.

When searching the Web for information about dietary supplements, try using directory sites of respected organizations, rather than doing blind searches with a search engine. Ask yourself the following questions:

- Who operates the site?
- Is the site run by the government, a university, or a reputable medical or health-related association (such as the American Medical Association, American Diabetes Association, American Heart Association, American Dietetic Association, National Institutes of Health, National Academy of Sciences, or the FDA)?
- Is the information written or reviewed by qualified health professionals, experts in the field, academia, government, or the medical community?
- What is the purpose of the site?
- Is the purpose of the site to objectively educate the public or just to sell a product?

Be aware of practitioners or organizations whose main interest is in marketing products, either directly or through sites with which they are linked. Commercial sites should clearly distinguish scientific information from advertisements. Most nonprofit and government sites contain no advertising, and access to the site and materials offered are usually free.

- What is the source of the information and does it have any references?
- Has the study been reviewed by recognized scientific experts and published in reputable peer-reviewed scientific journals, such as the New England Journal of Medicine?
- Does the information say “some studies show…” or does it state where the study is listed so that you can check the authenticity of the references? For example, can the study be found in the National Library of Medicine’s database of literature citations?
- Is the information current? Check the date when the material was posted or updated. Often new research or
other findings are not reflected in old material, for example, side effects or interactions with other products or new evidence that might have changed earlier thinking. Ideally, health and medical sites should be updated frequently.

- How reliable are the Internet and e-mail solicitations?
  While the Internet is a rich source of health information, it is also an easy vehicle for spreading myths, hoaxes, and rumors about alleged news, studies, products, or findings. To avoid falling prey to such hoaxes, be skeptical and watch out for overly emphatic language with UPPERCASE LETTERS and lots of exclamation points!!! Beware of such phrases as: “This is not a hoax” or “Send this to everyone you know.”

MORE TIPS AND TO-DO’S

Ask yourself:

- Does it sound too good to be true?
- Do the claims for the product seem exaggerated or unrealistic?
- Are there simplistic conclusions being drawn from a complex study to sell a product?

While the Web can be a valuable source of accurate, reliable information, it also has a wealth of misinformation that may not be obvious. Learn to distinguish hype from evidence-based science. Nonsensical lingo can sound very convincing. Also, be skeptical about anecdotal information from people who have no formal training in nutrition or botanicals, or personal testimonials (from store employees, friends, or online chat rooms and message boards) about incredible benefits or results obtained from using a product. Question these people on their training and knowledge in nutrition or medicine.

Think twice about chasing the latest headline. Sound health advice is generally based on a body of research, not a single study. Be wary of results claiming a “quick fix” that depart from previous research and scientific beliefs. Keep in mind science does not proceed by dramatic breakthroughs, but by taking many small steps, slowly building towards a consensus. Furthermore, news stories about the latest scientific study, especially those on TV or radio, are often too brief to include important details that may apply to you or allow you to make an informed decision.

Check your assumptions about the following:

Questionable Assumption 1: “Even if a product may not help me, at least it won’t hurt me.” It’s best not to assume that this will always be true. When consumed in high enough amounts, for a long enough time, or in combination with certain other substances, all chemicals can be toxic, including nutrients, plant components, and other biologically active ingredients.

Questionable Assumption 2: “When I see the term ‘natural,’ it means that a product is healthful and safe.” Consumers can be misled if they assume this term assures wholesomeness, or that these foodlike substances necessarily have milder effects, which makes them safer to use than drugs. The term natural on labels is not well defined and is sometimes used ambiguously to imply unsubstantiated benefits or safety. For example, many weight-loss products claim to be “natural” or “herbal,” but this doesn’t necessarily make them safe. Their ingredients may interact with drugs or may be dangerous for people with certain medical conditions.

Questionable Assumption 3: “A product is safe when there is no cautionary information on the product label.” Dietary supplement manufacturers may not necessarily include warnings about potential adverse effects on the labels of their products. If consumers want to know about the safety of a specific dietary supplement, they should contact the manufacturer of that brand directly. It is the manufacturer’s responsibility to determine that the supplement it produces or distributes is safe and that there is substantiated evidence that the label claims are truthful and not misleading.

Questionable Assumption 4: “A recall of a harmful product guarantees that all such harmful products will be immediately and completely removed from the marketplace.” A product recall of a dietary supplement is voluntary, and, while many manufacturers do their best, a recall does not necessarily remove all harmful products from the marketplace. Contact the manufacturer for more information about the specific product that you are purchasing. If you cannot tell whether the product you are purchasing meets the same standards as those used in the research studies you read about, check with the manufacturer or distributor. Ask to speak to someone who can address your questions, some of which may include: What information does the firm have to substantiate the claims made for the product? Be aware that sometimes firms supply so-called proof of their claims by citing undocumented reports from satisfied consumers, or “internal” graphs and charts that could be mistaken for evidence-based research. Does the firm have information to share about tests it has conducted on the safety or efficacy of the ingredients in the product? Does the firm have a quality control system in place to determine if the product actually contains what is stated on the label and is free of contaminants? Has the firm received any adverse event reports from consumers using their products?

NURSING IMPLICATIONS

When a nurse is caring for a patient who is involved with dietary supplements (using them, intending to use them,
or asking questions about them), the major nursing implication is mainly patient education.

1. Be prepared to teach clients how to do the following:
   a. Detect fraudulent products and deceptive advertising.
   b. Purchase quality products if they intend to use supplements.
   c. Read product labels.
   d. File a report if side effects are experienced.
   e. Recognize that dietary supplements can cause harm, the reasons they can be harmful, and the types of reactions that may occur.
   f. Reduce the chances of suffering adverse effects from supplement use.
2. Counsel patients to seek expert advice from their physicians before beginning any supplement regime.

The following information will assist you in preparing a teaching plan.

**Fraudulent Products**

Consumers need to be on the lookout for fraudulent products. These are products that don’t do what they say they can or don’t contain what they say they contain. At the very least, they waste consumers’ money, and they may cause physical harm.

Fraudulent products often can be identified by the types of claims made in their labeling, advertising, and promotional literature. Some possible indicators of fraud, according to the National Council Against Health Fraud, are the following:

1. Claims that the product is a secret cure and use of such terms as breakthrough, magical, miracle cure, and new discovery. If the product were a cure for a serious disease, it would be widely reported in the media and used by healthcare professionals.
2. “Pseudomedical” jargon, such as detoxify, purify, and energize to describe a product’s effects. These claims are vague and hard to measure, and so they make it easier for success to be claimed.
3. Claims that the product can cure a wide range of unrelated diseases. No product can do that.
4. Claims that a product is backed by scientific studies but with no list of references or references that are inadequate. For instance, if a list of references is provided, the citations cannot be traced, or if they are traceable, the studies are out-of-date, irrelevant, or poorly designed.
5. Claims that the supplement has only benefits and no side effects. A product “potent enough to help people will be potent enough to cause side effects.”
6. Accusations that the medical profession, drug companies, and the government are suppressing information about a particular treatment. It would be illogical for large numbers of people to withhold information about potential medical therapies when they or their families and friends might one day benefit from them.

Though often more difficult to do, consumers also can protect themselves from economic fraud, a practice in which the manufacturer substitutes part or all of a product with an inferior, cheaper ingredient and then passes off the fake product as the real thing but at a lower cost. Avoid products sold for considerably less money than competing brands.

**Quality Products**

Poor manufacturing practices are not unique to dietary supplements, but the growing market for supplements in a less restrictive regulatory environment creates the potential for supplements to be prone to quality-control problems. For example, the FDA has identified several problems where some manufacturers were buying herbs, plants, and other ingredients without first adequately testing them to determine whether the product they ordered was actually what they received or whether the ingredients were free from contaminants.

To help protect themselves, consumers should do the following:

1. Look for ingredients in products with the U.S.P. notation, which indicates the manufacturer followed standards established by the U.S. Pharmacopoeia.
2. Realize that the label term natural doesn’t guarantee that a product is safe. Think of poisonous mushrooms—they are natural.
3. Consider the name of the manufacturer or distributor. Supplements made by a nationally known food and drug manufacturer, for example, have likely been made under tight controls because these companies already have in place manufacturing standards for their other products.
4. Write to the supplement manufacturer for more information. Ask the company about the conditions under which its products were made.

**Reading and Reporting**

Consumers who use dietary supplements should always read product labels, follow directions, and heed all warnings.

Supplement users who suffer a serious harmful effect or illness that they think is related to supplement use should call a doctor or other healthcare provider. He or she in turn can report it to the FDA. To file a report, consumers will be asked to provide:

1. Name, address, and telephone number of the person who became ill
2. Name and address of the doctor or hospital providing medical treatment
3. Description of the problem
4. Name of the product and store where it was bought
Consumers also should report the problem to the manufacturer or distributor listed on the product's label and to the store where the product was bought.

**Expert Advice**

Before starting a dietary supplement, it is always wise to check with a medical doctor. It is especially important for people who have the following characteristics:

1. Pregnant or breastfeeding  
2. Chronically ill  
3. Elderly  
4. Under 18  
5. Taking prescription or over-the-counter medicines.  

Certain supplements can boost blood levels of certain drugs to dangerous levels.

**Harm**

Can dietary supplements be harmful? Under some circumstances, anything we ingest can be harmful, even ordinary food, and the same applies to dietary supplements. A dietary supplement (DS), especially one with multiple ingredients, can be harmful under one of the following circumstances (REASONS), assuming it is not a poison and it has been used by at least some individuals without adverse effects. Each circumstance has been substantiated by actual events of poisoning from dietary supplements in some individuals:

- **R** Raw impurities: The DS is not pure. It is mixed with some known or unknown ingredient or ingredients that are harmful at least to some individuals.

- **E** Excess levels of ingredients used: Intentionally or unintentionally the manufacturer has included an excess level of some of the ingredients. The excess substances have proved harmful to some consumers.

- **A** Allergic reactions to some ingredients in the dietary supplement for some individuals: The occurrence of this type of adverse effects is probably one of the most common observations among the consumers.

- **S** Systemic poisoning: This means the ingredients in the dietary supplement are distributed via the blood stream to various parts of the body and produce general poisonous effects in the body of some users. Most of the time, the cause of such poisoning is difficult to assess. One possibility is the interaction of ingredients in the body to a harmful by-product. Or, the ingredients interact with body organs or fluid to produce general by-products that interact among themselves to produce another by-product that is harmful.

- **O** Overdosing oneself: This is another common situation when adverse effects occur. Many users do not comply with the written instructions on the label. Instead of one tablet a day, three may be taken. Instead of swallowing a capsule, some open it and chew on the powder.

- **N** Negative reactions in some individuals because of a specific sensitivity: The substance is harmless for the average adult but may be harmful to infants, small children, and some elderly. The substance is not harmless under normal circumstances but may be harmful to individuals with certain clinical conditions, such as pregnancy, high blood pressure, and kidney diseases.

- **S** Safety of the product has not been carefully evaluated: In spite of legal requirements, many manufacturers have failed to conduct safety testing of their products.

Any consumer who enjoys using dietary supplements for whatever reasons, for example, nutritional benefits, clinical therapy, reversal of aging, is advised to perform a minimum amount of “homework” so that the chances of suffering adverse effects can be reduced. The following HOPES criteria serve as a good start:

- **H** Health status is an important clue. Are you sick? Do you have a terminal illness? Are you pregnant? You must be careful with the potential effect of a dietary supplement. The precaution applies even if you are taking the dietary supplement with an intention that it may cure your illness.

- **O** Overacting is a human weakness. When it comes to a dietary supplement, avoid it if you can. Even if it works and makes you feel better, there is no need to be excited. It may be a chance occurrence. Most important of all, do not overdose immediately because it “works.” That is, if the label recommends 2 tablets a day, do not take 4 or 5.

- **P** Product description is your major weapon for self-protection. Read the label several times. Ask yourself the following questions: Is there a name for the product? Are the ingredients listed? Is there a recommended daily dosage? Are there precaution statements? Is there a name and address for the manufacturer? It is not a good idea to put something in your mouth if there is no name and address for the manufacturer. Why? Because, if there is something wrong, no one can trace it to the manufacturer. The store where you buy it may have obtained it from a distributor. Without the manufacturer, no one knows what is inside, and your doctor cannot treat you if you show harmful effects.

- **E** Education is invariably a part of any health program. If you are serious about taking dietary supplements and willing to spend money on one or more such products, then you have the responsibility of educating yourself about dietary supplements. Talk to your friends with similar interest. Read up
on products, claims, and effects. Use the toll-free numbers for the FDA, FTC, and state consumer protection agencies to find out about any dietary supplement you are taking.

Symptoms from taking a dietary supplement are of course valuable indications that there is something wrong with the product. If you detect a slight sign of unwelcome symptoms in your body, stop the supplement immediately and seek medical attention.

Your HOPES of a minimum protection from adverse effects of any dietary supplement is to implement these five simple steps.

FDA ENFORCEMENT

The FDA uses many tools to enforce laws and regulations and some are described below:

1. Warning letters: The FDA sends a warning letter to inform a manufacturer that one or more of its products is illegal or needs correction. Responses are then processed between the FDA and the manufacturers.

2. Recalls: Recalls are actions taken by a firm to remove a product from the market. Recalls may be conducted on a firm's own initiative, by FDA request, or by FDA order under statutory authority. There are three classes of recalls:
   - Class I recall—A situation in which there is a reasonable probability that the use of or exposure to a violative product will cause serious adverse health consequences or death
   - Class II recall—A situation in which use of or exposure to a violative product may cause temporary or medically reversible adverse health consequences or where the probability of serious adverse health consequences is remote
   - Class III recall—A situation in which use of or exposure to a violative product is not likely to cause adverse health consequences

3. Seizures: When the FDA decides that a product may pose danger to the public and recall is not implemented, it will work with the appropriate law enforcement agency to seize the product and remove it from the market.

Each of the above enforcement approach has been applied to manufacturers whose dietary supplements have raised the issues of safety or illegal claims. Some examples follow.

Warning Letters

In April 2007, the FDA sent a warning letter to the manufacturer of a dietary supplement affecting public safety and illegal claims. The company sells a dietary supplement called “Cocaine.” Its Web site use the following descriptions or claims:

- “The Legal Alternative”
- The product name is “Cocaine,” and the letters in the product name appear to be spelled out in a white granular substance that resembles cocaine powder.
- “Speed in a Can”
- “Liquid Cocaine”
- “Cocaine - Instant Rush”
- “The question you have to ask yourself is: ‘Can I handle the rush?’”
- “This beverage should be consumed by responsible adults. Failure to adhere to this warning may result in excess excitement, stamina, . . . and possible feeling of euphoria.”
- Certain ingredients intended “to prevent, treat, or cure disease conditions.” “Inositol . . . reduces cholesterol in the blood; it helps prevent hardening of the arteries, and may protect nerve fibers from excess glucose damage. Inositol has a natural calming effect and may be used in the treatment of anxiety, depression, and obsessive-compulsive disorder without the side effects of prescription medications.”

According to the FDA, dietary supplements are products that are intended to supplement the diet. Street drug alternatives, meaning products that claim to mimic the effects of recreational drugs, are not intended to supplement the diet and, as a result, cannot lawfully be marketed as dietary supplements. Also, a dietary supplement may not bear claims that it prevents or treats a disease, except for authorized health claims about reducing the risk of a disease.

Since the outcome of each varies with conditions such as responses, remedies, legal actions, and so on, an interested party may access the FDA Web site to find more details about accessing the FDA’s archive of warning letters.

Recalls

Some examples of class I recalls are listed in Table 11-1.

Seizures

On October 12, 2007, the FDA distributed this news release:

At the request of the FDA, U.S. Marshals seized ~$71,000 of products from FullLife Natural Options, Inc., of Boca Raton, Florida, which marketed and distributed Charantea Ampalaya Capsules and Charantea Ampalaya Tea.

Although these products are labeled as dietary supplements, they are being promoted by FullLife for use in treating serious conditions, such as diabetes, anemia, and hypertension, both in printed
TABLE 11-1  Recalled Dietary Supplements

<table>
<thead>
<tr>
<th>Dietary Supplements Recalled</th>
<th>Reason</th>
<th>Recall Company</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIVIRO3 Natural Energy Enhancer Nutritional Supplement</td>
<td>Containing the legal prescription drug ingredient Tadalafil (treating erectile dysfunction)</td>
<td>Ebek, Inc., Los Angeles, CA</td>
<td>West Coast Laboratories Inc, Gardena, CA</td>
</tr>
<tr>
<td>Avian-Rx tablets labeled to contain herbal ingredients to bulletproof your immune system. The primary ingredients on the label: star anise extract, shikimic acid, and Hypericum perforatum.</td>
<td>Unapproved drug claim that it can prevent “Bird Flu”</td>
<td>Hi-Tech Pharmaceuticals, Inc., Norcross, GA</td>
<td>Hi-Tech Pharmaceuticals, Inc., Norcross, GA</td>
</tr>
<tr>
<td>Metaboslim All Natural Fat Eater Apple Cider Vinegar</td>
<td>Containing undeclared sibutramine, an active legal pharmaceutical ingredient used for weight loss in treatment of obesity</td>
<td>Confidence Inc., Port Washington, NY</td>
<td>Island Vitamins Inc., Farmingdale, NY</td>
</tr>
<tr>
<td>V.MAX Herbal Stamina Enhancer for Men Dietary Supplement, Cordyceps Militaries, L-Arginine, Psyllium Husk Powder, Licorice Root, Astragalus Membranaceus, Steamed Panax Ginseng</td>
<td>Containing aminotadalafil, an analogue of tadalafil, a legal drug used to treat erectile dysfunction</td>
<td>Barodon S.F., Inc., Los Angeles, CA</td>
<td>MegaCare Inc., Las Vegas, NV</td>
</tr>
<tr>
<td>Energy Max Energy Supplement Men’s formula Natural Herbs</td>
<td>Containing cryptosporidium, confirmed after investigating the illness of a 6-week-old infant in Minnesota who consumed the product. Cryptosporidium is a parasite that can cause intestinal infections.</td>
<td>MOM Enterprises, Inc., San Rafael, CA</td>
<td>Botanical Laboratories Inc., Ferndale, WA</td>
</tr>
</tbody>
</table>

and electronic (Web site) media distributed by the company.

FDA considers these products to be unapproved new drugs because they make claims related to the prevention or treatment of diseases in the products’ labeling. Such seizures protect consumers who may rely on unapproved products and unsubstantiated claims associated with these products when making important decisions about their health.

Following an investigation of the firm’s marketing practices, FDA officials advised FulLife that the claims related to prevention or treatment of diseases made these products subject to regulation as drugs. Despite FDA’s warnings, the firm failed to bring its marketing into compliance with the law. During subsequent inspections, FDA inspectors found that the offending claims were still being made.

**PROGRESS CHECK ON ACTIVITY 4**

TRUE/FALSE

Circle T for True and F for False.

1. **T** F I do not need to think about my total diet if I am taking dietary supplements.
2. **T** F Essential nutrients are safe, even when they are consumed in large doses.
3. **T** F I don’t need to check with my doctor or health-care provider before using supplements if I have read the labels on these supplements.
4. **T** F All dietary supplements are risk free because they are sold over the counter.
5. **T** F Because vitamin and mineral supplements are widely used and generally considered safe, you may safely give them to your children.
6. **T** F If one plans to use a dietary supplement in place of drugs or in combination with any drug, one should tell one’s healthcare provider first.
7. **T** F Dietary supplements, generally considered as safe, should not interact with prescription and over-the-counter (OTC) medicines.
8. **T** F When taking medication(s) or dietary supplement(s), advisories about these products should not be taken too seriously.
9. **T** F It is important to fully inform your doctor about the vitamins, minerals, herals, or any other supplements you are taking before elective surgery.
10. **T** F Under the law, manufacturers of dietary supplements are not responsible for making sure their products are safe before they go to market.
11. **T** F Manufacturers of dietary supplements are responsible for determining that the claims on their labels are accurate and truthful.
12. **T** F If the FDA can prove that claims on marketed dietary supplement products are false and misleading, the agency may take action against products with such claims.
13. **T** F When searching on the Web, the directory sites of organizations included in all search engines are reliable.
14. **T** F Most nonprofit and government sites contain no advertising, and access to the site and materials offered are usually free.
15. **T** F While the Web can be a valuable source of accurate, reliable information, it also has a wealth of misinformation that may not be obvious.
16. **T** F Information from trained people is usually more much more reliable than that from lay people.
17. **T** F Even if a product may not help me, at least it won’t hurt me.

18. **T** F When I see the term natural, it means that a product is healthful and safe.
19. **T** F A recall of a harmful product guarantees that all such harmful products will be immediately and completely removed from the marketplace.
20. **T** F It is appropriate to contact the manufacturer for more information about the specific product that one is purchasing.
21. **T** F When a nurse is caring for a patient who is involved with dietary supplements (using them, intending to use them, or asking questions about them), he or she should assist the patient in making appropriate choices through educating the patient and family regarding their use.
22. **T** F Fraudulent products often can be identified by the types of claims made in their labeling, advertising, and promotional literature.
23. **T** F According to the National Council Against Health Fraud, a product may be fraudulent if it contains claims such as breakthrough, magical, miracle cure, new discovery, detoxify, purify, energize, cure a wide range of unrelated diseases, and only benefits but no side effects.
24. **T** F Quality dietary supplements have no reason to carry the U.S.P. notation for their ingredients.
25. **T** F Nationally known food and drug manufacturers usually have tighter controls in their manufacturing methods for their products.
26. **T** F When a consumer starts to take a dietary supplement, he or she must check with a medical doctor.
27. **T** F Dietary supplements often contain plant products that may also be used in prescription medicine.

FILL-IN

28. Before starting a dietary supplement, it is always wise to check with a medical doctor. It is especially important for people who have the following characteristics:

29. The following minimal criteria should be followed when a person starts to take dietary supplements:

H. ______________________________________
O. ______________________________________
OBJECTIVES

Upon completion of this chapter the student should be able to do the following:

1. Identify five healing philosophies, approaches, and therapies not taught in medical schools.
2. Define complementary and alternative medicine (CAM):
   a. Describe the five domains or categories of CAM.
   b. List at least two examples in each domain and state the principal methods used in each.
3. Name at least five products or devices related to alternative medicine.
4. Describe the principle involved in using acupuncture as a complementary therapy in Western medicine.
5. Discuss ways to evaluate and provide reliable information to clients regarding the use of alternative medical treatment and practices.

GLOSSARY

Acupuncture: the use of very fine, thin wire needles inserted into the skin at specific sites in the body. A complementary therapy widely employed by licensed physicians. The needles used have received FDA approval.

Alternative: therapy used alone to treat an illness.
Biological-based: therapies employing herbs, special foods, and treatment with megadose vitamins and minerals and other ingested substances, such as laetrile or bee pollen.

Complementary: therapy used in addition to conventional therapy.

Complementary and alternative medicine (CAM): those therapies and medical practices not currently part of conventional medicine.

Conventional: therapies widely accepted and practiced by the mainstream medical community.

Energy therapy: a system that employs energy fields originating within the body or from electromagnetic fields outside the body.

Holistic: therapy that includes treatment of the whole person.

Homeopathic: a complete alternative medical system whose basic principle is “like cures like.”

Laetrile: an unapproved compound used as an anticancer treatment. Contains cyanide. Drug is not available in the United States. Side effects are severe and can cause death.

Manipulative or body-based: methods based on manipulation and/or movement of the body, for example, chiropractic or massage therapy.

Mind-body therapy: techniques employed to facilitate the mind’s capacity to affect body function and systems. Only two are considered mainstream: cognitive-behavioral approaches and patient education.

Naturopathic: a complete alternative medical system that emphasizes natural healing.

Preventive: therapy that seeks to prevent health problems from arising.

St.-John’s-wort: an herb used as an alternative treatment for depression.

**Background Information**

For more than a decade alternative medicine has played an increasing role in the health of Americans. In view of the extensive claims about its effectiveness, the information in this chapter is based on the following premises:

1. The purpose is to inform and not to recommend diagnosis, treatment, or cure.
2. Although nutrition and diet therapy are the subject matters of this book, their role in alternative medicine is only one consideration. To provide a meaningful picture of alternative medicine, this chapter discusses its entire spectrum, which includes diet and nutrition or human metabolism.
3. To ensure its accuracy and the absence of bias, all information in this chapter has been derived from educational materials distributed by the National Center for Complementary and Alternative Medicine, a unit within the U.S. National Institutes of Health.

Complementary and alternative medicine (CAM) covers a broad range of healing philosophies, approaches, and therapies. Generally, it is defined as those treatments and healthcare practices not taught widely in medical schools, not generally used in hospitals, and not usually reimbursed by medical insurance companies.

Many therapies are termed holistic, which means that the healthcare practitioner considers the whole person, including physical, mental, emotional, and spiritual aspects. Many therapies are also known as preventive, which means that the practitioner educates and treats the person to prevent health problems from arising, rather than treating symptoms after problems have occurred.

People use these treatments and therapies in a variety of ways. Therapies are used alone, in combination with other alternative therapies, or in addition to conventional therapies. Some approaches are consistent with physiological principles of Western medicine, while others constitute healing systems with a different origin. While some therapies are far outside the realm of accepted Western medical theory and practice, others are becoming established in mainstream medicine.

Complementary and alternative health care and medical practices are those health care and medical practices that are not currently an integral part of conventional medicine. The list of practices that are considered CAM changes continually as CAM practices and therapies that are proven safe and effective become accepted as “mainstream” healthcare practices.

A therapy is generally called *complementary* when it is used in addition to conventional treatments; it is often called *alternative* when it is used instead of conventional treatment. (Conventional treatments are those that are widely accepted and practiced by the mainstream medical community.) Depending on how they are used, some therapies can be considered either complementary or alternative. Complementary and alternative therapies are used in an effort to prevent illness, reduce stress, prevent or reduce side effects and symptoms, or control or cure disease.

Unlike conventional treatments for diseases, complementary and alternative therapies are often not covered by insurance companies. Patients should check with their insurance provider to find out about coverage for complementary and alternative therapies.

Patients considering complementary and alternative therapies should discuss this decision with their doctor or nurse, as they would any therapeutic approach, because some complementary and alternative therapies may interfere with their standard treatment or may be harmful when used with conventional treatment.
CHAPTER 12 ALTERNATIVE MEDICINE

PROGRESS CHECK ON BACKGROUND INFORMATION

FILL-IN

1. Complementary and alternative medicine (CAM) are treatments and healthcare practices generally not:
   a. 
   b. 
   c. 

2. Holistic treatment generally means that the healthcare practitioner considers the whole person, including aspects that are:
   a. 
   b. 
   c. 
   d. 

3. Name six products or devices related to alternate medicine:
   a. 
   b. 
   c. 
   d. 
   e. 
   f. 

TRUE/FALSE

Circle T for True and F for False.

4. T F Preventive therapy that seeks to prevent health problems from arising is generally taught in medical schools.

5. T F Biologically based therapies that employ herbs, special foods, and treatment with megadose vitamins and minerals and other ingested substances are completely ineffective in the eyes of most of the conventional medical practitioners in the United States.

6. T F Cognitive-behavior approach is a mind-body therapy not widely accepted by the conventional medical practitioner.

7. T F Patient education is critical in the employment of complementary and alternative medicine.

8. T F Acupuncture therapy uses very fine, thin needles inserted into the skin at specific sites in the body to achieve certain healing effects. It is widely accepted by conventional medical practitioners in the United States.

ACTIVITY 1:

Categories or Domains of Complementary and Alternative Medicine

Today, CAM practices may be grouped within five major domains: (1) alternative medical systems, (2) mind-body interventions, (3) biologically based treatments, (4) manipulative and body-based methods, and (5) energy therapies. The individual systems and treatments making up these categories are too numerous to list in this document. Thus, only limited examples are provided within each.

ALTERNATIVE MEDICAL SYSTEMS

Alternative medical systems involve complete systems of theory and practice that have evolved independent of and often prior to the conventional biomedical approach. Many are traditional systems of medicine that are practiced by individual cultures throughout the world, including a number of venerable Asian approaches.

Traditional Chinese medicine emphasizes the proper balance or disturbances of qi (pronounced chi or chee), or vital energy, in health and disease, respectively. Traditional Chinese medicine consists of a group of techniques and methods, including acupuncture, herbal medicine, oriental massage, and qi gong (a form of energy therapy described more fully later). Acupuncture involves stimulating specific anatomic points in the body for therapeutic purposes, usually by puncturing the skin with a needle.

Ayurveda is India’s traditional system of medicine. Ayurvedic medicine (meaning “science of life”) is a comprehensive system of medicine that places equal emphasis on body, mind, and spirit, and strives to restore the innate harmony of the individual. Some of the primary Ayurvedic treatments include diet, exercise, meditation, herbs, massage, exposure to sunlight, and controlled breathing.

Other traditional medical systems have been developed by Native American, Aboriginal, African, Middle Eastern, Tibetan, and Central and South American cultures.

Homeopathic and naturopathic medicine are also examples of complete alternative medical systems. Homeopathic medicine is an unconventional Western system that is based on the principle that “like cures like,” namely, that the same substance that in large doses produces the symptoms of an illness, in very minute doses cures it. Homeopathic physicians believe that the more dilute the remedy, the greater its potency. Therefore, they use small doses of specially prepared plant extracts and minerals to stimulate the body’s defense mechanisms and healing processes to treat illness.
Naturopathic medicine views disease as a manifestation of alterations in the processes by which the body naturally heals itself and emphasizes health restoration rather than disease treatment. Naturopathic physicians employ an array of healing practices, including diet and clinical nutrition; homeopathy; acupuncture; herbal medicine; hydrotherapy (the use of water in a range of temperatures and methods of applications); spinal and soft-tissue manipulation; physical therapies involving electric currents, ultrasound and light therapy; therapeutic counseling; and pharmacology.

**MIND-BODY INTERVENTIONS**

Mind-body interventions employ a variety of techniques designed to facilitate the mind’s capacity to affect bodily function and symptoms. Only a subset of mind-body interventions are considered CAM. Many interventions that have a well-documented theoretical basis, for example, patient education and cognitive-behavioral approaches, are now considered “mainstream.” Meditation; certain uses of hypnosis; dance, music, and art therapy; and prayer and mental healing still are categorized as complementary and alternative.

**BIOLOGICAL-BASED THERAPIES**

This category of CAM includes natural and biological-based practices, interventions, and products, many of which overlap with conventional medicine’s use of dietary supplements. Included in this category are herbal, special dietary, orthomolecular, and individual biological therapies. Herbal therapies employ individual or mixtures of herbs for therapeutic value. An herb is a plant or plant part that produces and contains chemical substances that act upon the body. Special diet therapies, such as those proposed by Drs. Atkins, Ornish, Pritikin, and Weil, are believed to prevent and/or control illness as well as promote health. Orthomolecular therapies aim to treat disease with varying concentrations of chemicals, such as magnesium, melatonin, and megadoses of vitamins. Biological therapies include, for example, the use of laetrile and shark cartilage to treat cancer and bee pollen to treat autoimmune and inflammatory diseases.

**MANIPULATIVE AND BODY-BASED METHODS**

This category includes methods that are based on manipulation and/or movement of the body. For example, chiropractors focus on the relationship between structure (primarily the spine) and function, and how that relationship affects the preservation and restoration of health, using manipulative therapy as an integral treatment tool. Some osteopaths, who place particular emphasis on the musculoskeletal system, believing that all of the body’s systems work together and that disturbances in one system may affect function elsewhere in the body, practice osteopathic manipulation. Massage therapists manipulate the soft tissues of the body to normalize those tissues.

**ENERGY THERAPIES**

Energy therapies focus either on energy fields originating within the body (biofields) or those from other sources (electromagnetic fields). Biofield therapies are intended to affect the energy fields, whose existence is not yet experimentally proven, that surround and penetrate the human body. Some forms of energy therapy manipulate biofields by applying pressure and/or manipulating the body by placing the hands in, or through, these fields. Examples include Qi gong, Reiki, and Therapeutic Touch. Qi gong is a component of traditional Chinese medicine that combines movement, meditation, and regulation of breathing to enhance the flow of vital energy (qi) in the body, to improve blood circulation, and to enhance immune function. Reiki, the Japanese word representing *Universal Life Energy*, is based on the belief that by channeling spiritual energy through the practitioner the spirit is healed, and it in turn heals the physical body. Therapeutic Touch is derived from the ancient technique of “laying-on of hands” and is based on the premise that it is the healing force of the therapist that affects the patient’s recovery and that healing is promoted when the body’s energies are in balance. By passing their hands over the patient, these healers identify energy imbalances.

Bioelectromagnetic-based therapies involve the unconventional use of electromagnetic fields—such as pulsed fields, magnetic fields, or alternating current or direct current fields—to, for example, treat asthma or cancer, or manage pain and migraine headaches.

**Progress Check on Activity 1**

**Fill-In**

1. The five major domains of CAM practices are:
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________
   e. __________________________

2. Traditional Asian medicine consists of mainly the following techniques and methods:
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________
3. Name five of the primary Ayurvedic treatments:
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
   e. ____________________________

4. Name five of the practices that naturopathic physicians will employ in healing:
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
   e. ____________________________

5. Examples of energy therapy that manipulate biofields by applying pressure and/or manipulating the body by placing the hands in, or through, these fields are:
   a. ____________________________
   b. ____________________________
   c. ____________________________

TRUE/FALSE
Circle T for True and F for False.

6. T F Alternative medical systems involve complete systems of theory and practice that have evolved independent of and often prior to the conventional biomedical approach.

7. T F Traditional Asian medicine emphasizes the proper balance or disturbances of qi (pronounced chi), or vital energy, in health and disease, respectively.

8. T F The basic principles of traditional Asian medicine principles and Ayurvedic medicine are completely different.

9. T F Homeopathic physicians use small doses of specially prepared plant extracts and minerals to stimulate the body’s defense mechanisms and healing processes in order to treat illness.

10. T F Naturopathic medicine views disease as a manifestation of alterations in the processes by which the body naturally heals itself and emphasizes health restoration rather than disease treatment.

11. T F Meditation; certain uses of hypnosis; dance, music, and art therapy; and prayer and mental healing are ineffective therapies in the minds of conventional medical practitioners.

12. T F Herbal therapies that employ individual or mixtures of herbs for therapeutic value are not effective means of treating any diseases.

13. T F Use of laetrile and shark cartilage to treat cancer has been proven to be effective.

14. T F Bee pollen to treat autoimmune and inflammatory diseases has not been proven to be effective.

15. T F Chiropractors focus on the relationship between structure (primarily the spine) and function, and how that relationship affects the preservation and restoration of health by using manipulative therapy.

16. T F Energy therapies focus either on energy fields originating within the body (biofields) or those from other sources (electromagnetic fields).

17. T F Qi gong is a component of traditional Asian medicine that combines movement, meditation, and regulation of breathing to enhance the flow of vital energy (qi) in the body, to improve blood circulation, and to enhance immune function.

18. T F Therapeutic Touch is very similar to the form of qi gong treatment that applies energy to the patient through an external source.

ACTIVITY 2:
Products, Devices, and Services Related to Complementary and Alternative Medicine

According to Amazon.com, there are more than 500 books on various products, devices, and services related to alternative medicine. The following are some that have attracted much attention from the government and consumers:

1. Acupuncture
2. Cancell/Entelev
3. Gerson therapy
4. Gonzalez protocol
5. Immuno-augmentative therapy
6. Coenzyme Q10
7. Laetrile
8. St.-John’s-wort
9. Cartilage (bovine and shark)
10. Hydrazine sulfate
11. Mistletoe

This chapter is not the proper forum to explore all of them. Instead, three specific examples are provided—acupuncture, laetrile, and St.-John’s-wort. Acupuncture has no dietary significance. It is included here as an illustration of nondietary alternative medicine. Laetrile and St.-John’s-wort have direct relationships to our diet because they are ingested for desired effects.
ACUPUNCTURE

Introduction

Acupuncture is one of the oldest, most commonly used medical procedures in the world. Originating in China more than 2000 years ago, acupuncture began to become better known in the United States in 1971, when New York Times reporter James Reston wrote about how doctors in China used needles to ease his abdominal pain after surgery. Research shows that acupuncture is beneficial in treating a variety of health conditions. In the past two decades, acupuncture has grown in popularity in the United States. A Harvard University study published in 1998 estimated that Americans made more than five million visits per year to acupuncture practitioners. The report from a Consensus Development Conference on Acupuncture held at the National Institutes of Health (NIH) in 1997 stated that acupuncture is being “widely” practiced by thousands of physicians, dentists, acupuncturists, and other practitioners— for relief or prevention of pain and for various other health conditions. NIH has funded a variety of research projects on acupuncture. These grants have been awarded by the National Center for Complementary and Alternative Medicine (NCCAM), the Office of Alternative Medicine (OAM, NCCAM’s predecessor), and other NIH institutes and centers. Traditional Chinese medicine theorizes that there are more than 2000 acupuncture points on the human body, and that these connect with 12 main and 8 secondary pathways called meridians. Chinese medicine practitioners believe these meridians conduct energy, or qi (pronounced chee or chi), throughout the body. Qi is believed to regulate spiritual, emotional, mental, and physical balance and to be influenced by the opposing forces of yin and yang.

According to traditional Chinese medicine, when yin and yang are balanced, they work together with the natural flow of qi to help the body achieve and maintain health. Acupuncture is believed to balance yin and yang, keep the normal flow of energy unblocked, and maintain or restore health to the body and mind.

Traditional Chinese medicine practices (including acupuncture, herbs, diet, massage, and meditative physical exercise) all are intended to improve the flow of qi. Western scientists have found meridians hard to identify because meridians do not directly correspond to nerve or blood circulation pathways. Some researchers believe that meridians are located throughout the body’s connective tissue; others do not believe that qi exists at all.

Such differences of opinion have made acupuncture an area of scientific controversy. Several processes have been proposed to explain acupuncture’s effects, primarily those on pain. Acupuncture points are believed to stimulate the central nervous system (the brain and spinal cord) to release chemicals into the muscles, spinal cord, and brain. These chemicals either change the experience of pain or release other chemicals, such as hormones, that influence the body’s self-regulating systems. The biochemical changes may stimulate the body’s natural healing abilities and promote physical and emotional well-being.

There are three main mechanisms under consideration:

- Conduction of electromagnetic signals: Western scientists have found evidence that acupuncture points are strategic conductors of electromagnetic signals. Stimulating points along these pathways through acupuncture enables electromagnetic signals to be relayed at a greater rate than under normal conditions. These signals may start the flow of pain-killing biochemicals, such as endorphins, and of immune system cells to specific sites in the body that are injured or vulnerable to disease.
- Activation of opioid systems: Research has found that several types of opioids may be released into the central nervous system during acupuncture treatment, thereby reducing pain.
- Changes in brain chemistry, sensation, and involuntary body functions: Studies have shown that acupuncture may alter brain chemistry by changing the release of neurotransmitters and neurohormones in a positive way.

Acupuncture also has been documented to affect the parts of the central nervous system related to sensation and involuntary body functions, such as immune reactions and processes whereby a person’s blood pressure, blood flow, and body temperature are regulated.

Preclinical studies have documented acupuncture’s effects, but they have not been able to fully explain how acupuncture works within the framework of the Western system of medicine.

Clinical Studies

According to the NIH Consensus Statement on Acupuncture:

Acupuncture as a therapeutic intervention is widely practiced in the United States. While there have been many studies of its potential usefulness, many of these studies provide equivocal results because of design, sample size, and other factors. The issue is further complicated by inherent difficulties in the use of appropriate controls, such as placebos and sham acupuncture groups. However, promising results have emerged, for example, showing efficacy of acupuncture in adult postoperative and chemotherapy nausea and vomiting and in postoperative dental pain. There are other situations such as addiction, stroke rehabilitation, headache, menstrual cramps, tennis elbow, fibromyalgia, myofascial pain, osteoarthritis, low back pain, carpal
tunnel syndrome, and asthma, in which acupuncture may be useful as an adjunct treatment or an acceptable alternative or may be included in a comprehensive management program. Further research is likely to uncover additional areas where acupuncture interventions will be useful.

Increasingly, acupuncture is complementing conventional therapies. For example, doctors may combine acupuncture and drugs to control surgery-related pain in their patients. By providing both acupuncture and certain conventional anesthetic drugs, some doctors have found it possible to achieve a state of complete pain relief for some patients. They also have found that using acupuncture lowers the need for conventional painkilling drugs and thus reduces the risk of side effects for patients who take the drugs.

Currently, one of the main reasons Americans seek acupuncture treatment is to relieve chronic pain, especially from conditions such as arthritis or lower back disorders. Some clinical studies show that acupuncture is effective in relieving both chronic (long-lasting) and acute or sudden pain, but other research indicates that it provides no relief from chronic pain. Additional research is needed to provide definitive answers.

**FDA's Role**

The U.S. Food and Drug Administration (FDA) approved acupuncture needles for use by licensed practitioners in 1996. The FDA requires manufacturers of acupuncture needles to label them for single use only. Relatively few complications from the use of acupuncture have been reported to the FDA when one considers the millions of people treated each year and the number of acupuncture needles used. Still, complications have resulted from inadequate sterilization of needles and from improper delivery of treatments. When not delivered properly, acupuncture can cause serious adverse effects, including infections and punctured organs.

**LAEOTRILE**

Laeotrile is a compound that has been used as an anticancer treatment in humans worldwide. It is not approved by the Food and Drug Administration for use in the United States. The term laetrile is an acronym (laevorotatory and mandelonitrile) used to describe a purified form of the chemical amygdalin. Amygdalin is a plant compound that contains sugar and produces cyanide. Amygdalin is found in the pits of many fruits and raw nuts. It is also found in other plants, such as lima beans, clover, and sorghum. Cyanide is believed to be the active cancer-killing ingredient in laetrile.

Although the names laetrile, Laetrile, and amygdalin are often used interchangeably, they are not the same product. The chemical make-up of Laetrile patented in the United States is different from the laetrile/amygdalin produced in Mexico. The patented Laetrile is a semisynthetic form of amygdalin, while the laetrile/amygdalin manufactured in Mexico is made from crushed apricot pits.

Amygdalin was first isolated in 1830 and was used as an anticancer agent in Russia as early as 1845. Its first recorded use in the United States as a treatment for cancer was in the 1920s. The early pill form of amygdalin was considered too toxic, and work with the compound was discontinued. In the 1950s, a reportedly nontoxic, semisynthetic form of amygdalin was developed and patented in the United States as Laetrile. Laetrile gained popularity in the 1970s as a single anticancer agent and as part of a metabolic therapy program consisting of a special diet, high-dose vitamin supplements, and pancreatic enzyme proteins that aid in the digestion of food. By 1978, more than 70,000 people in the United States had reportedly been treated with Laetrile.

Laetrile is administered by mouth (orally) as a pill. It can also be given by injection into a vein (intravenously) or muscle. Laetrile is commonly given intravenously over a period of time and then orally as maintenance therapy (treatment given to help extend the benefit of previous therapy).

The side effects associated with laetrile treatment are like the symptoms of cyanide poisoning. The symptoms include nausea and vomiting, headache, dizziness, bluish discoloration of the skin due to a lack of oxygen in the blood, liver damage, abnormally low blood pressure, droopy upper eyelid, difficulty walking due to damaged nerves, fever, mental confusion, coma, and death. The side effects can be increased by eating raw almonds or crushed fruit pits; eating certain types of fruits and vegetables including celery, peaches, bean sprouts, and carrots; or taking high doses of vitamin C. The side effects of laetrile appear to depend on the method of administration. More severe side effects are experienced when laetrile is given by mouth than when it is given by injection.

In nearly half a century, laetrile in the United States has gone through some “stormy weathers” scientifically, medically, legally, and commercially:

1. Scientifically, it is the position of the federal government that there is no sound scientific evidence to support the therapeutic claims for laetrile.
2. Medically, not all licensed physicians consider laetrile as a form of treatment for cancer. Physicians who use this substance as a curative agent on cancer patients are subject to prosecution.
3. Legally, there are several fronts:
   a. Several lawsuits have been filed on the constitutional rights of cancer patients to obtain laetrile to treat their conditions without interference from the government or the medical community.

3. Legally, there are several fronts:
b. The FDA has declared it is illegal to sell interstate laetrile or products claimed to contain laetrile as an ingredient. The products from several companies have been seized and some companies have been prosecuted.

c. States and federal governments have prosecuted licensed physicians who use laetrile to treat cancer patients.

The availability of laetrile in Mexico is a well known fact. Many cancer patients and/or their relatives and friends have visited Mexico to buy the substance. This is the action of a private citizen, and it is difficult for the United States government to intervene unless the person with the substance crosses the border between the two countries. It is illegal to bring laetrile into this country.

ST.-JOHN’S-WORT

St.-John’s-wort (Hypericum perforatum) is a long-living plant with yellow flowers. It contains many chemical compounds. Some are believed to be the active ingredients that produce the herb’s effects, including the compounds hypericin and hyperforin.

How these compounds actually work in the body is not yet known, but several theories have been suggested. Preliminary studies suggest that St.-John’s-wort might work by preventing nerve cells in the brain from reabsorbing the chemical messenger serotonin, or by reducing levels of a protein involved in the body’s immune system functioning.

St.-John’s-wort has been used for centuries to treat mental disorders as well as nerve pain. In ancient times, doctors and herbalists (specialists in herbs) wrote about its use as a sedative and treatment for malaria as well as a balm for wounds, burns, and insect bites. Today, St.-John’s-wort is used by some people to treat mild to moderate depression, anxiety, or sleep disorders.

Depressive illness comes in different forms. The three major forms are described here. Each can vary from person to person in terms of symptoms experienced and the severity of depression.

In major depression, people experience a sad mood or loss of interest or pleasure in activities for at least 2 weeks. In addition, they have at least four other symptoms of depression. Major depression can be mild, moderate, or severe. If it is not treated, it can last for 6 months or more.

In dysthymia, a milder, but more chronic form of depression, people experience a depressed mood for at least 2 years (1 year for children) accompanied by at least two other symptoms of depression.

In bipolar disorder, also called manic depression, a person has periods of depressive symptoms that alternate with periods of mania. Symptoms of mania include an abnormally high level of excitement and energy, racing thoughts, and behavior that is impulsive and inappropriate.

Some people still hold outdated beliefs about depression, for example, that the emotional symptoms caused by depression are “not real.” However, depression is a real medical condition. It can be treated effectively with conventional medicine, including antidepressant drugs and certain types of psychotherapy.

St.-John’s-wort has been used as an alternative therapy for depression. Some patients who take antidepressant drugs do not experience relief from their depression. Other patients have reported unpleasant side effects from their prescription medication, such as a dry mouth, nausea, headache, or effects on sexual function or sleep. Sometimes people turn to herbal preparations like St.-John’s-wort because they believe “natural” products are better for them than prescription medications, or that natural products are always safe. Neither of these statements is true (discussed further later). Finally, cost can be a reason. St.-John’s-wort costs less than many antidepressant medications, and it is sold without a prescription (over the counter).

In Europe, St.-John’s-wort is widely prescribed for depression. In the United States, St.-John’s-wort is not a prescription medication, but there is considerable public interest in it. St.-John’s-wort remains among the top-selling herbal products in the United States.

St.-John’s-wort products are sold in the following forms:

- Capsules
- Teas—the dried herb is added to boiling water and steeped for a period of time
- Extracts—specific types of chemicals are removed from the herb, leaving the desired chemicals in a concentrated form

Does St.-John’s-wort work as a treatment for depression? There has been scientific research to try to answer this question. The general observation is as follows. In Europe, results from a number of scientific studies have supported the effectiveness of certain extracts of St.-John’s-wort for depression. In the United States several clinical studies have concluded that this herb is not effective in treating depression. Irrespective of scientific evidence, many consumers in this country take a supplement of St.-John’s-wort regularly to treat depression.

Are there any risks to taking St.-John’s-wort for depression? Yes, many so-called natural substances can have harmful effects—especially if they are taken in too large a quantity or if they interact with something else the person is taking.

Research from the NIH has shown that St.-John’s-wort interacts with some drugs—including certain drugs used to control HIV infection (such as indinavir). It may also interact with drugs that help prevent the body from rejecting transplanted organs (such as cyclosporine). Using St.-John’s-wort limits these drugs’ effectiveness. Also, St.-John’s-wort is not a proven therapy for depression.
If depression is not adequately treated, it can become severe and, in some cases, may be associated with suicide. Consult a healthcare practitioner if you or someone you care about may be experiencing depression. People can experience side effects from taking St.-John’s-wort. The most common side effects include dry mouth, dizziness, gastrointestinal symptoms, increased sensitivity to sunlight, and fatigue.

Herbal products such as St.-John’s-wort are classified as dietary supplements by the U.S. Food and Drug Administration (FDA), a regulatory agency of the federal government. The FDA’s requirements for testing and obtaining approval to sell dietary supplements are less strict than its requirements for drugs (see Chapter 11). Unlike drugs, herbal products can be sold without requiring studies on dosage, safety, or effectiveness.

The strength and quality of herbal products are often unpredictable. Products can differ in content not only from brand to brand, but from batch to batch. Information on labels may be misleading or inaccurate.

Consult Chapter 11 on dietary supplements.

NURSING IMPLICATIONS

Regarding alternative medicine, the nurse’s role is educational:

1. Be prepared to answer client questions.
2. Evaluate all information before providing it to a client.
3. Chart any alternative or complementary therapies the client is using; some may be contraindicated to traditional medicine.

Questions and answers for the nurse and the client are discussed in the following sections


Ask your healthcare provider about complementary and alternative medical treatments and practices in general, and about those particular practices used for your specific health problems.

Increasingly, healthcare providers are becoming familiar with alternative treatments or are able to refer you to someone who is. For scientific information about the safety and effectiveness of a particular treatment, ask your healthcare provider to obtain valid information for you.

If your healthcare provider cannot provide information, medical libraries, public libraries, and popular bookstores are good places to find information about particular complementary and alternative medical practices.

Also, you may want to ask practitioners of complementary and alternative health care about their practices. Many practitioners belong to a growing number of professional associations, educational organizations, and research institutions that provide information about complementary and alternative medical practices. Many organizations are developing Web sites.

Remember that these organizations may advocate a specific therapy or treatment and may be unable to provide complete and objective health information.

How Can I Find a Practitioner in My Area?

To find a qualified complementary and alternative medical healthcare practitioner, you may want to contact medical regulatory and licensing agencies in your state. These agencies may be able to provide information about a specific practitioner’s credentials and background. Many states license practitioners who provide alternative therapies such as acupuncture, chiropractic services, naturopathy, herbal medicine, homeopathy, and massage therapy.

You may also locate practitioners by asking your healthcare provider or by contacting a professional association or organization. These organizations can provide names of local practitioners and provide information about how to determine the quality of a specific practitioner’s services.

When Considering Complementary and Alternative Therapies, What Questions Should Patients Ask Their Healthcare Provider?

The following are basic questions many patients ask:

• What benefits can be expected from this therapy?
• What are the risks associated with this therapy?
• Do the known benefits outweigh the risks?
• What side effects can be expected?
• Will the therapy interfere with conventional treatment?
• Is this therapy part of a clinical trial? If so, who is sponsoring the trial?
• Will the therapy be covered by health insurance?

How Do I Evaluate Medical Resources on the Web?

The number of Web sites offering health-related resources grows every day. Many sites provide valuable information, while others may have information that is unreliable or misleading. This short guide contains important questions you should consider as you look for health information online. Answering these questions when you visit a new site will help you evaluate the information you find. There are 10 things you should know:

1. Who runs this site? Any good health-related Web site should make it easy for you to learn who is responsible for the site and its information.
2. Who pays for the site? It costs money to run a Web site. The source of a Web site’s funding should be clearly stated or readily apparent. For example, Web addresses ending in “.gov” denote a federal government-sponsored site. You should know how the site pays for its existence. Does it sell advertising? Is it sponsored by a drug company? The source of funding can affect what content is presented, how the content is presented, and what the site owners want to accomplish on the site.

3. What is the purpose of the site? This question is related to who runs and pays for the site. An “About This Site” link appears on many sites; if it is there, use it. The purpose of the site should be clearly stated and should help you evaluate the trustworthiness of the information.

4. Where does the information come from? Many health and medical sites post information collected from other Web sites or sources. If the person or organization in charge of the site did not create the information, the original source should be clearly labeled.

5. What is the basis of the information? In addition to identifying who wrote the material you are reading, the site should describe the evidence that the material is based on. Medical facts and figures should have references (such as to articles in medical journals). Also, opinions or advice should be clearly set apart from information that is “evidence based” (that is, based on research results).

6. How is the information selected? Is there an editorial board? Do people with excellent medical qualifications review the material before it is posted?

7. How current is the information? Web sites should be reviewed and updated on a regular basis. It is particularly important that medical information be current. The most recent update or review date should be clearly posted. Even if the information has not changed, you want to know whether the site owners have reviewed it recently to ensure that it is still valid.

8. How does the site choose links to other sites? Web sites usually have a policy about how they establish links to other sites. Some medical sites take a conservative approach and don’t link to any other sites. Some link to any site that asks, or pays, for a link. Others only link to sites that have met certain criteria.

9. What information about you does the site collect, and why? Web sites routinely track the paths visitors take through their sites to determine what pages are being used. However, many health Web sites ask for you to “subscribe” or “become a member.” In some cases, this may be so that they can collect a user fee or select information for you that is relevant to your concerns. In all cases, this will give the site personal information about you.

Any credible health site asking for this kind of information should tell you exactly what they will and will not do with it. Many commercial sites sell “aggregate” (collected) data about their users to other companies, information such as what percentage of their users are women with breast cancer, for example. In some cases, they may collect and reuse information that is “personally identifiable,” such as your ZIP code, gender, and birth date. Be certain that you read and understand any privacy policy or similar language on the site, and don’t sign up for anything that you are not sure you fully understand.

10. How does the site manage interactions with visitors? There should always be a way for you to contact the site owner if you run across problems or have questions or feedback. If the site hosts chat rooms or other online discussion areas, it should tell visitors what the terms of using this service are. Is it moderated? If so, by whom, and why? It is always a good idea to spend time reading the discussion without joining in, so that you feel comfortable with the environment before becoming a participant.

Progress Check on Activity 2

Fill-In

1. The three main proposed mechanisms for acupuncture are:
   a. ______________________
   b. ______________________
   c. ______________________

2. Name five side effects of laetrile treatment:
   a. ______________________
   b. ______________________
   c. ______________________
   d. ______________________
   e. ______________________

3. Name three places where information about complementary and alternative medicine (CAM) practices can be obtained:
   a. ______________________
   b. ______________________
   c. ______________________

4. Important questions one should consider as one looks for health information online are:
   a. ______________________
   b. ______________________
c. __________________________________________
d. __________________________________________
e. __________________________________________
f. __________________________________________
g. __________________________________________
h. __________________________________________
i. __________________________________________
j. __________________________________________

TRUE/FALSE

Circle T for True and F for False.

5. T F Traditional Chinese medicine is based on the presence of qi and its travel in the body through the meridians, and the balance of yin and yang that works with natural qi in the body.

6. T F Qi is believed to regulate spiritual, emotional, mental, and physical balance and to be influenced by the opposing forces of yin and yang.

7. T F Traditional Chinese medicine practices (including acupuncture, herbs, diet, massage, and meditative physical exercise) all are intended to improve the flow of qi.

8. T F Meridians exist in a form that can be identified by Western scientists.

9. T F One of the main reasons Americans seek acupuncture treatment is to relieve chronic pain, especially from conditions such as arthritis or lower back disorders.

10. T F Laetrile is an effective compound that has been used as an anticancer treatment in humans worldwide.

11. T F The term laetrile is an acronym used to describe a purified form of the chemical amygdalin.

12. T F The names laetrile, Laetrile, and amygdalin mean the same product.

13. T F The laetrile/amygdalin manufactured in Mexico is made from crushed apricot pits.

14. T F Laetrile is commonly given intravenously over a period of time and then orally as maintenance therapy (treatment given to help extend the benefit of previous therapy). The side effects of laetrile treatment are usually fairly mild.

15. T F The side effects of laetrile are similar regardless of the method of administration.

16. T F St.-John's-wort is classified as a dietary supplement by the U.S. Food and Drug Administration (FDA).

17. T F The composition of St.-John's-wort and how it might work are well understood.

18. T F Scientific evidence shows that St.-John's-wort is useful for treating mild to moderate depression but is of no benefit in treating major depression of moderate severity.

19. T F Since St.-John's-wort is classified by FDA as a dietary supplement, it is safe and has no side effects.

20. T F Regarding CAM, a nurse must be able to answer patient's questions and evaluate information before providing advice.

21. T F Healthcare practitioners are obligated to provide complementary and alternative medical treatments and practices in general, and those particular practices used for your specific health problems.

22. T F CAM practitioners do not have to be certified in the United States.

REFERENCES


CHAPTER 13
Food Ecology

**Time for completion**
Activities: 1 hour
Optional examination: ½ hour

**OBJECTIVES**

Upon completion of this chapter, the student should be able to do the following:

1. Describe the appropriate methods for the safe handling, storage, and preparation of food to prevent illness by:
   a. recognizing agents that cause food-borne illness.
   b. knowing ways to minimize contamination.
   c. becoming familiar with regulations regarding the protection of food.
2. Describe the appropriate methods for handling, storing, and preparing food to conserve nutrients by becoming knowledgeable about:
   a. nutrition labeling.
   b. pasteurization, enrichment, and fortification of foods.

**GLOSSARY**

**Bacteria:** small unicellular microorganisms. They are spherical (cocci), rod shaped (bacilli), comma shaped (vibrios), or spiral (spirochetes). The symptoms produced by the bacteria depend on the type of bacteria ingested.

**Enrichment:** the addition of thiamin, niacin, riboflavin, and iron to bread and cereal products. The amount added to foods is set by the federal government.
Fortification: the addition of one or more nutrients not originally present in the food.

GRAS: generally recognized as safe. These are additives that have been used for a long time without known ill effects. Substances and additives sanctioned by the FDA prior to 1958.

Pasteurization: the practice of heating milk to 140°F for 30 seconds to kill disease-producing bacteria, or to 161°F for 15 seconds.

Restoration: replacing food nutrients that were present before processing but were destroyed by the processing.

URI: upper respiratory infection.

Virus: a minute microorganism much smaller than a bacterium. It has no independent cell activity. Viruses reproduce inside a host cell. More than 200 disease-producing viruses have been identified.

BACKGROUND INFORMATION

No matter how thorough an individual’s knowledge is regarding the nutritional value of foods, unless the food is safe, there can be no optimal diets. No matter how carefully selected, food can only provide nourishment and health if it has been handled in such a way that it is neither contaminated nor a source of food-borne illness. Certain organisms that are transmitted to humans through food cause illness and sometimes death.

Modern food technology and sanitation practices have greatly reduced the threat of commercial food contamination. Food labelings have enabled consumers to be aware of the contents of food purchased. However, unsafe food-handling practices and nutrient losses from food preparation persist and continue to create problems even in modern societies. This is especially true in any group-eating environments, including healthcare facilities, shelter and retirement centers, schools, and restaurants.

Information on food safety has been derived from the following Web sites of U.S. government agencies:

2. Food Safety Inspection Service of the USDA: www.fsis.gov
3. Food and Drug Administration: www.fda.gov
4. Centers for Disease Controls: www.cdc.gov
5. A combined government Web site: www.foodsafety.gov

Once you reach a Web site, you can search for relevant words or phrases such as:

- Enrichment
- Cooking and nutrients
- Food labels

ACTIVITY 1:

Food Safety

CAUSES OF FOOD-BORNE ILLNESS

The three most common biological agents of illness that are transmitted to people from the food supply are bacteria, parasites, and viruses. The two most common factors causing transmission are human carelessness and lack of knowledge of food handling. Examples of causative factors include:

1. Contamination of the water supply
2. Sewage seeping into livestock food
3. Poor personal hygiene—for example, from the oral-fecal route, not washing hands after using the toilet
4. Improper storage of raw foods, especially eggs, meats, fish, poultry, and dairy products
5. Improper storage of cooked foods—for example, using deep pans for storage of hot food, which slows the cooling of food
6. Improper preparation of foods—for example, under-cooking food, especially pork and pork products
7. Improper holding temperatures—that is, above 40°F and below 140°F; improper thawing of frozen food, such as at room temperature
8. Poor health practices, especially in group settings; examples include sneezing and coughing onto food, blowing nose over food, not washing hands before handling food, and handling food with hands that have open sores or boils
9. Contamination by organisms transmitted from food handler to food or equipment and cross-contamination between foods
10. Lack of knowledge by food handlers of the potential hazards of the organisms they carry

For reference purposes, Table 13-1 describes the characteristics of some common food-borne diseases.

BACTERIA AND FOOD TEMPERATURE

To minimize the risk of food-borne illnesses, all individuals should take care to keep food clean to prevent bacteria from multiplying, and to adequately cook fresh and frozen meat, fish, poultry, and eggs.

The majority of cases of food poisoning are from bacteria or toxin from the bacteria. If we know what causes bacteria to multiply, we can take preventive measures. Given a few pathogens and favorable conditions, a harmless food can quickly become a source of illness.
<table>
<thead>
<tr>
<th>Disease and Organism That Causes It</th>
<th>Source of Illness</th>
<th>Symptoms</th>
<th>Prevention Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonellosis <em>Salmonella</em> (bacteria; more than 1,700 kinds)</td>
<td>May be found in raw meats, poultry, eggs, fish, milk, and products made with them. Multiplies rapidly at room temperature.</td>
<td>Onset: 12–48 hours after eating. Nausea, fever, headache abdominal cramps, diarrhea, and sometimes vomiting. Can be fatal in infants, the elderly, and the infirm.</td>
<td>Handling food in a sanitary manner. Thorough cooking of foods. Prompt and proper refrigeration of foods.</td>
</tr>
<tr>
<td>Staphylococcal food poisoning Staphylococcal enterotoxin (produced by <em>Staphylococcus aureus</em> bacteria)</td>
<td>The toxin is produced when food contaminated with the bacteria is left too long at room temperature. Meats, poultry, egg products, tuna, potato and macaroni salads, and cream-filled pastries are good environments for these bacteria to produce toxin.</td>
<td>Onset: 1–8 hours after eating. Diarrhea, vomiting, nausea, abdominal cramps, and prostration. Mimics flu. Lasts 24–48 hours. Rarely fatal.</td>
<td>Sanitary food handling practices. Prompt and proper refrigeration of foods.</td>
</tr>
<tr>
<td>Botulism Botulinum toxin (produced by <em>Clostridium botulinum</em> bacteria)</td>
<td>Bacteria are widespread in the environment. However, bacteria produce toxin only in an anaerobic (oxygenless) environment of little acidity. Types A, B, and F may result from inadequate processing of low-acid canned foods, such as green beans, mushrooms, spinach, olives, and beef. Type E normally occurs in fish.</td>
<td>Onset: 8–36 hours after eating. Neurotoxic symptoms, including double vision, inability to swallow, speech difficulty, and progressive paralysis of the respiratory system. Obtain medical help immediately. Botulism can be fatal.</td>
<td>Using proper methods for canning low-acid foods. Avoidance of commercially canned low-acid foods with leaky seals or with bent, bulging, or broken cans. Toxin can be destroyed after a can is opened by boiling contents hard for 10 minutes—not recommended.</td>
</tr>
<tr>
<td>Perfringens food poisoning <em>Clostridium perfringens</em> (rod-shaped bacteria)</td>
<td>Bacteria are widespread in environment. Generally found in meat and poultry and dishes made with them. Multiply rapidly when foods are left at room temperature too long. Destroyed by cooking.</td>
<td>Onset: 8–22 hours after eating (usually 12). Abdominal pain and diarrhea. Sometimes nausea and vomiting. Symptoms last a day or less and are usually mild. Can be more serious in older or debilitated people.</td>
<td>Sanitary handling of foods, especially meat and meat dishes and gravies. Thorough cooking of foods. Prompt and proper refrigeration.</td>
</tr>
<tr>
<td>Shigellosis (bacillary dysentery) <em>Shigella</em> (bacteria)</td>
<td>Food becomes contaminated when a human carrier with poor sanitary habits handles liquid or moist food that is then not cooked thoroughly. Organisms multiply in food stored above room temperature. Found in milk and dairy products, poultry, and potato salad.</td>
<td>Onset: 1–7 days after eating. Abdominal pain, cramps, diarrhea, fever, sometimes vomiting, and blood, pus, or mucus in stools. Can be serious in infants, the elderly, or debilitated people.</td>
<td>Handling food in a sanitary manner. Proper sewage disposal. Proper refrigeration of foods.</td>
</tr>
</tbody>
</table>

*continues*
<table>
<thead>
<tr>
<th>Disease and Organism That Causes It</th>
<th>Source of Illness</th>
<th>Symptoms</th>
<th>Prevention Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campylobacteriosis</td>
<td><em>Campylobacter jejuni</em> (rod-shaped bacteria)</td>
<td>Bacteria found on poultry, cattle, and sheep and can contaminate the meat and milk of these animals. Chief food sources: raw poultry and meat and unpasteurized milk.</td>
<td>Onset: 2–5 days after eating. Diarrhea, abdominal cramping, fever, and sometimes bloody stools. Lasts 2–7 days.</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td><em>Yersinia enterocolitica</em> (non-spore-forming bacteria)</td>
<td>Ubiquitous in nature, carried in food and water. Bacteria multiply rapidly at room temperature, as well as at refrigerator temperatures (4° to 9°C). Generally found in raw vegetables, meats, water, and unpasteurized milk.</td>
<td>Onset: 2–5 days after eating. Fever, headache, nausea, diarrhea, and general malaise. Mimics flu. An important cause of gastroenteritis in children. Can also infect other age groups and, if not treated, can lead to other more serious diseases (such as lymphadenitis, arthritis, and Reiter’s syndrome).</td>
</tr>
<tr>
<td>Cereus food poisoning</td>
<td><em>Bacillus cereus</em> (bacteria and possibly their toxin)</td>
<td>Illness may be caused by the bacteria, which are widespread in the environment, or by an enterotoxin created by the bacteria. Found in raw foods. Bacteria multiply rapidly in foods stored at room temperature.</td>
<td>Onset: 1–18 hours after eating. Two types of illness: (1) abdominal pain and diarrhea, and (2) nausea and vomiting. Lasts less than a day.</td>
</tr>
<tr>
<td>Cholera</td>
<td><em>Vibrio cholera</em> (bacteria)</td>
<td>Found in fish and shellfish harvested from waters contaminated by human sewage. (Bacteria may also occur naturally in Gulf Coast waters.) Chief food sources: seafood, especially types eaten raw (such as oysters).</td>
<td>Onset: 1–3 days. Can range from “subclinical” (a mild uncomplicated bout with diarrhea) to fatal (intense diarrhea with dehydration). Severe cases require hospitalization.</td>
</tr>
<tr>
<td>Hemorrhagic colitis (gastroenteritis, intestinal disorders)</td>
<td>Escherichia coli O157:H7 (entero-hemorrhagic E. coli or EHEC)</td>
<td>Undercooked or raw hamburger (ground beef) has been implicated in many of the documented outbreaks; however, E. coli O157:H7 outbreaks have implicated alfalfa sprouts, unpasteurized fruit juices, dry-cured salami, lettuce,game meat, and cheese curds. Raw milk was the vehicle in a school outbreak in Canada.</td>
<td>The illness is characterized by severe cramping (abdominal pain) and diarrhea, which is initially watery but becomes grossly bloody. Occasionally vomiting occurs. Fever is either low-grade or absent. The illness is usually self-limited and lasts for an average of 8 days. Some individuals exhibit watery diarrhea only.</td>
</tr>
</tbody>
</table>

*continues*
### TABLE 13-1 (continued)

<table>
<thead>
<tr>
<th>Disease and Organism That Causes It</th>
<th>Source of Illness</th>
<th>Symptoms</th>
<th>Prevention Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal disease Enteroviruses rotaviruses parvoviruses</td>
<td>Viruses exist in the intestinal tract of humans and are expelled in feces. Contamination of foods can occur in three ways: (1) when sewage is used to enrich garden/farm soil; (2) by direct hand-to-food contact during the preparation of meals; and (3) when shellfish-growing waters are contaminated by sewage.</td>
<td>Onset: After 24 hours. Severe diarrhea, nausea, and vomiting. Respiratory symptoms. Usually lasts 4–5 days but may last for weeks.</td>
<td>Sanitary handling of foods. Use of pure drinking water. Adequate sewage disposal. Adequate cooking of foods.</td>
</tr>
<tr>
<td>Hepatitis Hepatitis A virus</td>
<td>Chief food sources: shellfish harvested from contaminated areas, and foods that are handled a lot during preparation and then eaten raw (such as vegetables).</td>
<td>Jaundice, fatigue. May cause liver damage and death.</td>
<td>Sanitary handling of foods. Use of pure drinking water. Adequate sewage disposal. Adequate cooking of foods.</td>
</tr>
<tr>
<td>Listeriosis L. Monocytogenes.</td>
<td>Associated with such foods as raw milk, supposedly pasteurized fluid milk, cheeses (particularly soft-ripened varieties), ice cream, raw vegetables, fermented raw-meat sausages, raw and cooked poultry, raw meats (all types), and raw and smoked fish. Its ability to grow at temperatures as low as 3°C permits multiplication in refrigerated foods.</td>
<td>The onset time to serious forms of listeriosis is unknown but may range from a few days to 3 weeks. The onset time to gastrointestinal symptoms is unknown but is probably greater than 12 hours. The manifestations of listeriosis include septicemia, meningitis (or meningoencephalitis), encephalitis, and intrauterine or cervical infections in pregnant women, which may result in spontaneous abortion (2nd/3rd trimester) or stillbirth. The onset of the aforementioned disorders is usually preceded by influenza-like symptoms including persistent fever. It was reported that gastrointestinal symptoms such as nausea, vomiting, and diarrhea may precede more serious forms of listeriosis or may be the only symptoms expressed.</td>
<td>Handling food in a sanitary manner. Thorough cooking of foods. Prompt and proper refrigeration of foods.</td>
</tr>
<tr>
<td>Mycotoxicosis Mycotoxins (from molds)</td>
<td>Produced in foods that are relatively high in moisture. Chief food sources: beans and grains that have been stored in a moist place.</td>
<td>May cause liver and/or kidney disease.</td>
<td>Checking foods for visible mold and discarding those that are contaminated. Proper storage of susceptible foods.</td>
</tr>
</tbody>
</table>

*continues*
Bacteria thrive in foods that are moist, warm, good sources of protein, and low in acid. A few thrive in the absence of oxygen supply (anaerobic). These bacteria are usually in home-canned low-acid foods where they produce the deadly botulism toxin.

The time-temperature factor is critical in preventing bacteria from multiplying. After purchasing food, it is essential to minimize the opportunity for bacteria incubation by properly storing, preparing, and handling food. Figure 13-1 depicts the effects of temperature on potential disease-producing organisms.

Observation of safe food preparation practices is an effective way to prevent food-borne illness. These practices, which all family members should observe, are listed below.

### SAFE FOOD-PREPARATION PRACTICES

Observe personal hygiene:

1. Hands should always be clean whenever food is handled. Hot water and soap should be used to wash hands after going to the bathroom, before handling cooked foods, and after handling raw food.
2. A person who is ill should not prepare food.
3. During food preparation, contact between hands and the mouth, nose, or hair should be avoided, as should coughing and sneezing over foods. Tissues or handkerchiefs should be used to prevent contamination.
4. Tasting food with fingers and utensils used during preparation is not advised, even if the cooking temperature is very hot.

The following guidelines apply to the food environment:

1. All kitchen equipment and utensils should be thoroughly cleaned before being used with any foods.
2. Cooked foods should not be allowed to stand at room temperature for more than two to three hours whenever feasible. Exposure of food to temperatures between 5°C and 60°C (40°F and 140°F) should be kept to a minimum. The practice of preparing foods a day or several hours before eating should be done with care and avoided if possible.
3. Hot foods should never be allowed to cool slowly to room temperature before refrigerating. The slow cooling period provides an ideal growth temperature for bacteria. Foods should be refrigerated immediately after removing from a steam table or warming oven. A shallow pan, cold running water, or ice bath can be used to cool foods rapidly for storage. A large amount of food in a big container requires additional cooling time before all the contents are below 7°C (45°F), potentially creating an environment for bacteria to grow.
4. When leftovers are served, the food should be heated until all parts reach a temperature of 74°C (165°F). This destroys all vegetative cells of bacteria. Whenever applicable, food should be chopped into small pieces and boiled to destroy any susceptible vegetative cells of the bacteria. No cooling should be permitted after preparation—the food should be served hot.
5. Certain popular foods—stuffed turkey, gravies, cream pies and puddings, sandwiches, and salads—are

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Giardiasis</td>
<td>Protozoa exist in the intestinal tract of humans and are expelled in feces. Contamination of foods can occur in two ways: (1) when sewage is used to enrich garden/farm soil; and (2) by direct hand-to-food contact during the preparation of meals. Chief food sources: foods that are handled a lot during preparation.</td>
<td>Diarrhea, abdominal pain, flatulence, abdominal distention, nutritional disturbances, “nervous” symptoms, anorexia, nausea, and vomiting.</td>
<td>Sanitary handling of foods. Avoidance of raw fruits and vegetables in areas where the protozoa is endemic. Proper sewage disposal.</td>
</tr>
<tr>
<td>Amebiasis</td>
<td>Tenderness over the colon or liver, loose morning stools, recurrent diarrhea, change in bowel habits, “nervous” symptoms, loss of weight, and fatigue. Anemia may be present.</td>
<td>Sanitary handling of foods. Avoidance of raw fruits and vegetables in areas where the protozoa is endemic. Proper sewage disposal.</td>
<td></td>
</tr>
</tbody>
</table>

frequent culprits in food poisoning. When preparing roast turkey, do not stuff the bird but cook the stuffing separately. If turkey is stuffed with raw fillers, avoid stuffing it the night before. If stuffing is cooked separately, it should be cooked immediately after mixing, especially if in a large quantity. Stuffing is an excellent place for bacteria to grow, and if a large amount of lukewarm stuffing is permitted to stand at room temperature, the organisms will surely multiply.

6. Gravies and broths are quite susceptible to bacterial contamination, especially as leftovers. These foods should be placed in the refrigerator as soon as possible. Gravy or broth should not be held in the refrigerator more than one or two days, and it should be reheated or boiled for several minutes before serving. A reheated dressing should not be permitted to stay at room temperature.

7. Cream pies and puddings are also often involved in food poisoning. People dislike keeping these items in the refrigerator, because they can become soggy. However, leaving them at room temperature can allow bacteria to multiply rapidly. Ideally, such pastries should be prepared as close to serving time as possible.

8. Items such as ham sandwiches, turkey and chicken salads, and deviled eggs require special attention. One good practice is to freeze the sandwiches immediately after preparation and thaw them whenever they are needed. Chicken salads may be prepared by using frozen chicken cubes, which will thaw as the salad stands. The entire salad dish should be kept cool.

### CASE HISTORIES OF FOOD POISONING IN THE UNITED STATES

#### Salmonella

On April 12, 2008, the Food and Drug Administration (FDA) announced that at least 21 people in 13 states have been diagnosed with salmonellosis that was caused by the same strain of *Salmonella* that was found in the recently recalled unsweetened Puffed Rice and unsweetened Puffed Wheat Cereals produced by Malt-O-Meal.

The recalled products were distributed nationally under the Malt-O-Meal brand name as well as under private label brands including Acme, America’s Choice, Food Club, Giant, Hannaford, Jewel, Laura Lynn, Pathmark, Shaw’s, ShopRite, Tops, and Weis Quality.

*Salmonella* is a type of bacteria that can cause serious and sometimes fatal infections in young children, frail or elderly people, and others with weakened immune systems. Symptoms of food-borne *Salmonella* infection include nausea, vomiting, fever, diarrhea, and abdominal cramps. In persons with poor health or weakened immune systems, *Salmonella* can invade the bloodstream and cause life-threatening infections.

#### Listeriosis

On November 13, 2000, healthcare providers at a hospital in Winston-Salem, North Carolina, contacted the local health department about three cases of listeriosis within a 2-week period in recent Mexican immigrants.

The recalled products were distributed nationally under the Malt-O-Meal brand name as well as under private label brands including Acme, America’s Choice, Food Club, Giant, Hannaford, Jewel, Laura Lynn, Pathmark, Shaw’s, ShopRite, Tops, and Weis Quality.

*Listeria monocytogenes* is a type of bacteria that can cause serious and sometimes fatal infections in young children, frail or elderly people, and others with weakened immune systems. Symptoms of food-borne *Listeria monocytogenes* infection include nausea, vomiting, fever, diarrhea, and abdominal cramps. In persons with poor health or weakened immune systems, *Listeria monocytogenes* can invade the bloodstream and cause life-threatening infections.

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<table>
<thead>
<tr>
<th>Temperature (°F)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>Canning temperatures for low-acid vegetables, meat, and poultry in pressure canner.</td>
</tr>
<tr>
<td>240</td>
<td>Canning temperatures for fruits, tomatoes, and pickles in waterbath canner.</td>
</tr>
<tr>
<td>212</td>
<td>Cooking temperatures destroy most bacteria. Time required to kill bacteria decreases as temperature is increased.</td>
</tr>
<tr>
<td>165</td>
<td>Warming temperatures prevent growth but allow survival of some bacteria.</td>
</tr>
<tr>
<td>140</td>
<td>Some bacterial growth may occur. Many bacteria survive.</td>
</tr>
<tr>
<td>125</td>
<td>Danger zone Foods held more than 2 hours in this zone are subject to rapid growth of bacteria and the production of toxins by some bacteria.</td>
</tr>
<tr>
<td>60</td>
<td>Some growth of food poisoning bacteria may occur.</td>
</tr>
<tr>
<td>40</td>
<td>Cold temperatures permit slow growth of some bacteria that cause spoilage.</td>
</tr>
<tr>
<td>32</td>
<td>Freezing temperatures stop growth of bacteria, but may allow bacteria to survive. Foods can spoil at temperatures below freezing. Do not store food at 0°F for more than a few weeks.</td>
</tr>
<tr>
<td>0</td>
<td>Do not store raw meats for more than 5 days or poultry, fish, or ground meat for more than 2 days in the refrigerator.</td>
</tr>
</tbody>
</table>

**FIGURE 13-1 Temperature Guide to Food Safety**

Source: Distributed by the U.S. Department of Agriculture.
Culturally appropriate education efforts are important to reduce the risk for *L. monocytogenes* transmission through Mexican-style fresh soft cheese. All patients were Hispanic and 10 were pregnant women. Infection with *L. monocytogenes* resulted in five stillbirths, three premature deliveries, and two infected newborns. On hospital admission, the women reported symptoms that included fever, chills, headache, abdominal cramps, stiff neck, vomiting, and photophobia. Patients had eaten the following food items purchased from door-to-door vendors: Queso fresco, a Mexican-style fresh soft cheese; and hotdogs. Illness was not associated with purchases at specific markets or supermarkets, eating raw fruits or vegetables, deli products, other cheeses (e.g., American, cheddar, mozzarella, and blue/Gorgonzola), or other dairy products.

Various members of the Hispanic immigrant community made the Mexican-style fresh soft cheese from raw milk in their homes. Inspectors found unlabeled homemade cheese in all three of the small local Latino grocery stores they visited in Winston-Salem. In addition, many persons regularly sold the cheese in parking lots and by going door to door. Owners of two local dairies reported selling raw milk. Milk samples were obtained from these two Forsyth County dairies and from three dairies in neighboring counties. *L. monocytogenes* isolates were obtained from nine patients, three cheese samples from two stores, one cheese sample from the home of a patient, and one raw milk sample from a manufacturing grade dairy.

As a result of this outbreak, North Carolina health authorities stopped the sale of raw milk by the dairy farm to noncommercial processors and educated store owners that it is illegal to sell unregulated dairy products. Officials cited the outbreak as sufficient reason to strengthen laws prohibiting the sale of raw milk except to regulated processors.

Despite laws prohibiting the sale and consumption of raw milk and raw milk products, such practices persist in some communities as a result of consumers' taste preferences and for cultural reasons. The popularity of queso fresco has resulted in several outbreaks in Hispanic communities since the 1980s. In 1985, an outbreak of septic abortions attributed to *L. monocytogenes* occurred among Hispanics in Los Angeles and Orange counties, California. In 1997, three outbreaks occurred in Hispanic communities in northern California and Washington.

Because queso fresco in these communities is produced in private homes, food safety regulations are difficult to enforce. However, the following approaches have some success:

1. Massive education programs using Spanish-speaking health providers with background on cultural practices. The targets are Hispanic consumers, especially pregnant women.
2. Intense training of grandmothers in the Hispanic communities since they are usually the ones making the soft cheeses.
3. Stringent regulatory action on use of raw milk and responsibility of sellers (vendors, grocery stores).

**RESPONSIBILITIES OF HEALTH PERSONNEL**

A health practitioner should emphasize the following when educating a client, an institution, or the general public:

1. Observe sanitary practices that minimize the likelihood of food-borne illness.
2. Teach all family members the principles of cleanliness.
3. Check closely for sanitary, safe practices being followed among all personnel working in a healthcare setting.
4. Make your clients aware that bacteria are a major cause of food-borne illness, and that they thrive in a warm, moist environment.
5. Foods kept at a temperature between 60°F and 125°F for more than two hours may not be safe to eat.
6. Observe good hand-washing technique.
7. Advise individuals not to work with or around food when they are ill or have any skin lesions.
8. If insecticides are used, counsel extreme caution in cooking and eating areas to prevent contamination of food.
9. Regularly inspect all areas where food is stored and prepared.
10. Perform laboratory cultures on a regular basis in healthcare facilities.
11. Encourage mandatory regular teaching of food personnel and demonstrations of appropriate techniques of safe food handling.
12. Check the source of supply of food items (supplier).
13. Purchase only those food items that meet government regulations for safety, such as pasteurized milk and dairy products, USDA inspected meats, and fish.

**PROGRESS CHECK ON ACTIVITY 1**

**FILL-IN**

1. Describe five ways in which a food may be contaminated by a food handler.
   
   a. ____________________________________
   
   b. ____________________________________
   
   c. ____________________________________
   
   d. ____________________________________
   
   e. ____________________________________
2. The storage temperature of perishable foods must be below ________ °F or above ________ °F in order to retard the growth of bacteria.
   a. 32, 200
   b. 40, 140
   c. 60, 170
   d. 80, 190

3. What is the major causative agent in food-borne illness?

4. Describe how temperature and moisture affect the growth of organisms.

5. List five prevention methods for contamination of foods.
   a. ________________________________
   b. ________________________________
   c. ________________________________
   d. ________________________________
   e. ________________________________

6. List the most common gastrointestinal symptoms of food-borne illness.

   ________________________________

TRUE/FALSE
Circle T for True and F for False.

7. T F Leftover food should be cooled completely before it is refrigerated.

8. T F Cooking reduces the number of pathogenic bacteria but does not destroy all of them.

9. T F Cooking may not provide protection against food contaminated with staphylococcus.

10. T F Cooking destroys most parasites and viruses.

ACTIVITY 2:

Nutrient Conservation

Nutrients may also be lost during processing or preservation of foods. At home, nutrients can also be lost during storage, preparation, and cooking of foods.

Using good food-preparation methods to maximize nutrient retention is especially important when the diet is limited or low in certain nutrients. The following measures are recommended to minimize loss during storage, preparation, and cooking.

STORAGE

1. Avoid bruising soft, fresh produce such as berries and peaches.

2. Store perishable items at the recommended temperature, usually in the refrigerator or freezer.

3. Store foods, except fresh meats, in containers that allow little room for air to circulate, or wrap the foods in moisture- and vapor-proof material.
4. Package green vegetables in such a way that they stay crisp. Keep them slightly moist, not wet. (Washed lettuce keeps well if wrapped loosely in a clean towel and enclosed in a plastic bag.)
5. Store less perishable items (such as canned foods, dry cereals, cooking oils) in a cool, dry place.
6. If foods are not stored in opaque or colored glass containers, store away from the light.
7. Use fresh foods as quickly after harvesting as possible.
8. Store food in glass jars in a dark place.
9. Plan for fast turnover of food on the shelf or in the refrigerator to avoid long storage times. Use leftovers as soon as possible.

**PREPARATION**

1. Prepare fresh produce as close to time of use as is practical.
2. Use a very sharp knife for cutting fresh produce.
3. Avoid soaking cut fruits and vegetables, especially if they are your major source of any water-soluble nutrients.
4. When appropriate, scrub vegetables instead of paring them and leave them whole instead of cutting them.
5. If paring is desired, pare as thinly as possible. If practical (as for beets and potatoes), peel after cooking.
6. Use clean fresh vegetable parings for making stock for soup.
7. Use the liquid from canned fruit as an ingredient in homemade fruit punch.
8. Save time, fuel, and nutrients by eating raw fruits and vegetables often.
9. Avoid reheating leftover cooked vegetables by using them in cold salads.
10. Discard bruised or dried outside leaves of vegetables.

**COOKING**

1. Cook vegetables for the shortest time possible, just until tender.
2. If cooking any type of vegetable in water, make sure it is boiling rapidly before vegetable is added.
3. Cook vegetables in the smallest amount of water practical for the type of pan, but take care not to scorch them. A small volume of water is especially helpful to reduce nutrient loss when cooking vegetables that are cut into small pieces. Cover the pan tightly to minimize the amount of water needed.
4. Steam, microwave, or pressure cook clean, whole, unpeeled vegetables.
5. Stir-fry vegetables the Asian way.
6. Plan meals so that vegetables can be served as soon as they are cooked.
7. Heat canned vegetables in the liquid in which they are packed.
8. Use cooking liquid from vegetables and drippings from meat for gravy, sauces, soup stock, or for cooking grains such as rice. Small amounts of cooking liquid can be saved and stored in the freezer.
9. Do not add baking soda when cooking vegetables, even though it makes green vegetables stay brightly colored.

**FOOD ADDITIVES AS NUTRIENTS**

To process food and preserve nutrients, chemical substances are added to foods. While these procedures are necessary, they have confused the consumer and changed the nutrient content of many foods. In addition, new foods are being introduced to the consumer daily for which the nutrient content is unknown. Some measures to protect and enlighten the consumer have been established by the government.

The FDA enforces laws and regulations to ensure that food is safe, wholesome, and properly labeled. Outside substances are present, intentionally and accidentally, in food as a result of processing, storage, or packaging. Some substances are intentionally added to food to enhance its nutritional value. This takes two forms:

1. **Enrichment:** The addition of thiamin, niacin, riboflavin, and iron to bread, flour, and cereal products in amounts set by the government. The word restoration is sometimes used when the addition of nutrients to a food is to restore it to its original quality. These are nutrients that have been lost through manufacturing or processing.
2. **Fortification:** Addition to food of one or more nutrients not originally present or occurring only in minute amounts. Some examples are: adding vitamin D to milk, adding vitamins A and D to skim milk and nonfat dry milk; adding iodine to salt; and adding fluoride to water.

Nonnutritive additives do not improve quality. They preserve food and prevent unwanted changes (for example, antioxidants).

All additives to food must be approved by the FDA. There is a category of additives generally recognized as safe (known as GRAS). These substances are sanctioned by the FDA and have been in widespread use over a long period of time without known ill effects. All others must undergo rigid testing before being added to foods.

To protect consumers and educate them about their nutrient intakes, the FDA has established regulations for food labeling.

Nutritional labeling is mandatory on FDA-regulated products as of January 1993 (see Chapter 1). There is a standardized format for presenting the information.

**SUMMARY**

The government’s role and the individual’s role in conserving nutrients are important considerations for health personnel.
Safeguarding the food supply, appropriate selection and purchase of foods, label reading, and knowledge of nutrition principles can prevent illness and improve health.

**RESPONSIBILITIES OF HEALTH PERSONNEL**

When counseling a client, an institution, or the general public, a health practitioner should do the following:

1. Teach clients that many foods lose nutrients, especially vitamins, during storage.
2. Teach clients that food storage at warm temperatures increases nutrient loss as well as bacterial and insect growth.
3. Make clients aware that nutrients are lost by unnecessary trimming, dissolving, soaking, or cooking foods in water.
4. Teach clients that nutrients are lost by overcooking.
5. Teach clients and families that proper food storage, preparation, and cooking techniques can improve their nutritional status.
6. Educate consumers about the advantages of properly reading nutrition labels.
7. Encourage clients to learn the general principles of nutrition.
8. Encourage food producers to maintain high-quality products.

**Progress Check on Activity 2**

**FILL-IN**

1. Nutrition labeling is not mandatory in which two circumstances?
   a. 
   b. 

2. List three advantages to nutrition labeling.
   a. 
   b. 
   c. 

3. Identify three practices to preserve nutrient content of foods during storage.
   a. 
   b. 
   c. 

4. Identify at least six food preparation and cooking practices that keep nutrient loss at a minimum.
   a. 
   b. 

c. 
d. 
e. 
f. 

Define the following terms:

5. Enrichment ____________________________  
6. Fortification ____________________________  
7. Restoration ____________________________  

8. Name two types of food additives and give one example of each.
   a. 
   b. 

**REFERENCES**


United States government Web sites:
b. Food Safety Inspection Service of the USDA: www.fsis.gov
c. Food and Drug Administration: www.fda.gov
d. Centers for Disease Controls: www.cdc.gov
e. A combined government Web site: www.foodsafety.gov
PART III

Nutrition and Diet Therapy for Adults

Chapter 14 Overview of Therapeutic Nutrition
Chapter 15 Diet Therapy for Surgical Conditions
Chapter 16 Diet Therapy for Cardiovascular Disorders
Chapter 17 Diet and Disorders of Ingestion, Digestion, and Absorption
Chapter 18 Diet Therapy for Diabetes Mellitus
Chapter 19 Diet and Disorders of the Liver, Gallbladder, and Pancreas
Chapter 20 Diet Therapy for Renal Disorders
Chapter 21 Nutrition and Diet Therapy for Cancer Patients and Patients with HIV Infection
Chapter 22 Diet Therapy for Burns, Immobilized Patients, Mental Patients, and Eating Disorders
CHAPTER 14

Overview of Therapeutic Nutrition

Time for completion
Activities: 1 hour
Optional examination: ½ hour

OBJECTIVES
Upon completion of this chapter, the student should be able to do the following:
1. Define the principles of diet therapy.
2. Explain the objectives of diet therapy.
3. Describe the methods used to adapt a normal diet to treat a specific clinical disorder.
4. Identify the most common therapeutic diets used in clinical care.

GLOSSARY
Acculturation: traditions, values, or religious beliefs that compose a way of life (see Chapter 2).
Ascites: an abnormal accumulation of fluid in the peritoneal cavity resulting in distention of the abdomen.
Diet therapy: The use of any diet for restoring or maintaining optimal nutritional status and body homeostasis.
Distention: stretching, enlarging.
Edema: abnormal accumulation of fluid in body tissues (intercellular space).
Gastritis: inflammation of the stomach.
Liquid diet: a modified diet consisting of foods that pour or become liquid at body temperature (see Activity 2).
Mechanically altered diet: a regular diet that has been modified in texture and/or seasoning, depending on the medical needs of the patient (see Activity 2).

Modified diet: a regular diet that has been altered to meet specific requirements of individuals with a disease or disorder.

Peritoneal: pertaining to the serous membrane lining the walls of the abdominal and pelvic cavities.

Satiety: feeling of fullness, satisfaction.

**Background Information**

**Basic Principles**

Therapeutic nutrition is based on the modification of the nutrients or other aspects of a normal diet to meet a person’s nutritional needs during an illness. An understanding of the basics of normal nutrition is a prerequisite to the study of the principles of diet therapy. A nurse’s background in anatomy, physiology, and pathophysiology will facilitate the clinical application of these principles.

The purpose of diet therapy is to restore or maintain an acceptable nutritional status of a patient. This is accomplished by modifying one or more of the following aspects of the diet:

1. Basic nutrient(s)
2. Caloric contribution
3. Texture or consistency
4. Seasonings

In adapting a normal diet to treat a disease, one or more of these modifications may be needed to restore or maintain the good nutritional status of a given patient. In general, all therapeutic diets must consider physical factors, clinical disorders, and the patient’s total acculturation.

In many cases, the patient may require an alteration of feeding methods in order to accomplish the stated purpose of diet therapy. It may also become necessary to alter the feeding intervals. These changes will be discussed in Activity 2.

The nurse’s role is critical in helping a patient adjust to a modified diet by acting as the coordinator, interpreter, and teacher of diet therapy. Meeting the patient’s nutritional needs involves the coordination of the medical, dietary, and nursing staff. In larger hospitals, the nurse maintains liaisons among the patient, the physician, and the dietician; assists the patient at meals; observes the patient’s response to foods and beverages; charts pertinent information; and supports and supplements the primary instruction given by the dietician. In small hospitals, nursing homes, and community nursing services, the nurse may be responsible for planning, supervising, and teaching the modified diet. In many cases, the nurse may need to interpret the diet and make food selections both for the patient and the kitchen personnel.

It is important to emphasize that in the practice of medical nutrition therapy one must consider the following:

1. The professional healthcare providers in each clinic, hospital, or other medical institution practice diet therapy according to their experience, available resources and cultural preferences of the patients in addition to the medical diagnosis and treatment. So, the details about any dietary regimen may differ from those presented in this book. Your instructor will explain the status where applicable.

2. The Internet is a valuable tool that helps both care providers and patients to learn more about the dietary care the patient is receiving. Therefore, it is important to access a specific Web site using a popular search engine where applicable.

**Kinds and Uses of Exchange Lists**

Exchange lists for calculating various modified diets are employed by nutritionists, dietitians, and other health professionals to accurately calculate the amounts and kinds of foods required. These include exchange lists for diabetes, weight reduction or gain, renal disorders, and phenylketonuria. The bases for all these lists are the food groups for selecting a balanced diet. Food lists are classified primarily on their key nutrients, all the foods in a particular group having approximately the same set of nutrients. When diets are calculated, for whatever reason, the recommended servings are intended to provide at least 80 percent of the RDAs/DRIs for all nutrients. When the health professional instructs a client, he or she does not use the figures from nutrients when instructing. Instead, figures are given in terms of foods that will meet the nutrient requirement. The Food Guide Pyramid, therefore, is very practical. The patient can use it to plan menus, order meals in restaurants, and make grocery lists. Checking the foods selected from each group can give the patient and counselor an estimate of how adequate the diet is. The food groups do not account for ethnic and mixed dishes, and will need to be interpreted according to variations acceptable to the client. Supplements to the food groups can be added whenever the diet is not adequate for a particular individual.

**The Food Exchange System of Dietary Control**

Created by the American Dietetic Association and the American Diabetes Association, this system is widely used in planning all kinds of diets. It is based on exchange lists, which group foods according to their carbohydrate, protein, and fat content. Caloric content of the diet can be calculated when these are known. Diets can therefore be designed to modify basic nutrients, energy value, texture, and/or seasonings (primarily sodium content) (see
Activity 3). The percentage of each of the energy nutrients (carbohydrate, protein, and fat) in the diet can be figured to meet the dietary guidelines for Americans. The exchange system is presented in Appendix F.

**Renal Diet Exchange System**

For patients with renal disease, the exchange lists become even more detailed. These individuals must be able to pick foods from each of the lists in a renal exchange diet that do not exceed their prescribed levels of sodium, potassium, calcium, and protein, as well as managing total calories and any fluid restrictions. Renal patients are usually counseled several times by the health team and closely followed to assess compliance and needed nutrient changes. Since these diets are very individualized, an exchange list for renal patients is not included in this book. See Chapter 20 for details on the treatment of renal disorders.

**Exchange Lists for Phenylketonuria (PKU)**

According to the nature of the metabolic error that causes the birth of an infant with PKU, the exchanges are created for two main purposes: to furnish adequate nutrition for rapid growth and a healthy child, while keeping the phenylalanine level low enough to prevent the mental retardation and other unacceptable changes that take place when rigid diet control is not imposed.

The exchange lists for PKU infants and children are not within the scope of this book, but the health professional should be aware that these lists are available and be proficient in providing caregivers of these children with instructions concerning them. See Chapter 28 for more details on PKU, the disease, and treatment. Also, Web sites are the best resources.

The use of the labeling laws as discussed in Chapter 1 will add to the ability of the professional to provide additional information to consumers when they are interpreting these lists. Consumers who learn to read the labels will find that they are more confident and better able to follow diet instructions when using any of the lists.

**Health Team**

Under the current system in a hospital, the nutrition and dietary care of a patient is managed by a health team of three core members: doctor, nurse, and dietitian. Other health professionals also participate in the care, including pharmacists, physical therapists, and so on.

The role of each of the three core members is as follows. The doctor orders the diet, the dietitian implements it, and the nurse coordinates meals and nutrition requirements with other clinical treatments for a patient.

To comply with legal requirements, a dietitian must be registered with the American Dietetic Association. This person carries the title of Registered Dietitian (R.D.). The word dietitian in this book refers to this health professional.

**Medical Terms**

For many years, terms such as diet therapy, dietary management, nutrition therapy, therapeutic diets, and nutrition feedings have been used interchangeably. The United States Congress, working with the American Dietetic Association, recently passed legislation that recognizes medical nutrition therapy (MNT) as a covered Medicare benefit. At present, only a few chronic disorders are covered by this act, but the number will grow.

**Progress Check on Background Information**

**FILL-IN**

1. What is the major principle of therapeutic nutrition? 

2. State the purpose of diet therapy. 

3. Describe the methods used to adapt a normal diet to a disease condition. 

4. What are the four most common therapeutic diet modifications? 
   a. 
   b. 
   c. 
   d. 

5. Identify four illness factors that affect food consumption. 
   a. 
   b. 
   c. 
   d. 

6. Explain the nurse’s role in helping a patient adjust to a therapeutic diet modification. 
   a. 
   b. 
   c. 
   d. 

ACTIVITY 1:  
Principles and Objectives of Diet Therapy

Health professionals in care of the hospitalized patient must consider the physiological, psychological, cultural, social, and economic factors of the patient. Illness may alter any of these factors.

The stress of illness brings about many fears in the hospitalized patient and often causes personality changes. Immobilization can disrupt nutritional balance and interfere with patient care. In addition, drug therapy often reduces food intake and interferes with nutrient utilization. The disease process itself modifies food acceptance. Food preferences may revert to those of childhood favorites. Symbolic security foods may be desired. Some patients express their fear, frustration, and hostility by rejecting food and showing resentment toward everyone connected with it.

Another major source of stress is the frequent necessity to modify the diet. When confronted with this necessity, patients often respond irrationally and refuse to accept the change. The health team can help a hospitalized patient accept a therapeutic diet by recognizing the many factors that affect the patient and then helping with the adjustment. In this milieu, the nurse becomes the key to the success or failure of a modified diet.

The patient’s nutritional needs are evaluated according to past nutrition practices and the clinical disorder. If nutritional status was poor before admission, the patient’s needs will be greater than those of a well-nourished patient. Each analysis must be individualized.

The focus of diet therapy is on the patient’s identified needs and problems. The diet plan should be relevant to the nature of the illness and its effects on the body. It should be based on sound, scientific rationale in line with current nutrition concepts. The nurse should question a prescribed diet that shows no apparent relationship to the disease. It is helpful to educate the patient by providing a rationale and expected effects of the modified diet.

PROGRESS CHECK ON ACTIVITY 1

FILL-IN

1. List five factors that affect the nutritional care of the hospitalized patient.
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
   e. ____________________________

2. List four ways that the stress of illness affects food acceptance.
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________

3. What is the focus of diet therapy?
   ____________________________

4. Upon which principle is therapeutic nutrition based? ____________________________

5. What is the purpose of diet therapy? ____________________________

ACTIVITY 2:  
Routine Hospital Diets

REGULAR DIETS

The “normal,” “regular,” or “house” diet is the most frequently used of all diets in hospitals. A normal diet, like a modified diet, is of great importance in a therapeutic sense. When a patient eats well, the body’s damaged tissues (from the illness) are continuously repaired and maintained.

The normal diet in a hospital must meet the RDAs/DRIs. During illnesses, the additional stress is often accommodated by increasing these allowances. The daily food groups are often the basis for dietary planning. The normal hospital diet has no restrictions of food choice.

MECHANICALLY ALTERED OR FIBER-RESTRICTED DIETS

These diets are the second most common hospital diets. They differ from a normal diet in texture and seasonings, depending on the needs of the patient. The diet is a nutritionally adequate diet. The following differentiates these two types of diets.

Mechanically Altered Diet

The mechanically altered diet is limited to soft foods for those who have difficulty chewing food because of missing teeth or poorly fitting dentures. The seasonings and
preparation of this diet are the same as those for a normal diet.

Table 14-1 describes foods permitted in a mechanically altered diet.

**Fiber-Restricted Diet**

The fiber-restricted diet differs from the normal diet in being reduced in fiber content and soft in consistency. It serves as a transition to a normal diet following surgery, in acute infections and fevers, and in gastrointestinal disturbances.

Table 14-2 describes foods permitted and prohibited in a soft, fiber-restricted diet. Table 14-3 provides a sample menu for a fiber-restricted diet.

**LIQUID DIETS**

A liquid diet consists of foods that will pour or are liquid at body temperature. The nutritive value of liquid diets is low and, consequently, such diets are used only for very limited periods of time. Liquid diets may be clear-liquid or full-liquid. They are standard hospital diets. The liquid diet is used for various reasons. One objective is to keep fecal matter in the colon at a minimum. The clear-liquid diet may be used after surgery. The diet can replace fluids lost from vomiting or diarrhea. The clear-liquid diet is composed mainly of water and carbohydrates. It is only a temporary diet, since it is nutritionally inadequate. Its use is typically limited to 24 to 36 hours.

**Clear-Liquid Diet**

This diet permits tea, coffee or coffee substitute, and fat-free broth. Ginger ale, fruit juices, flavored gelatin, fruit ices, and water gruels (strained and liquefied cooked cereals) are sometimes given. Small amounts of fluid are given to the patient every hour or two. For example, the diet is used for 24 to 48 hours following acute vomiting, diarrhea, or surgery.

### TABLE 14-1 Foods Permitted in a Mechanically Altered Diet

<table>
<thead>
<tr>
<th>Food Types</th>
<th>Foods Permitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>All forms</td>
</tr>
<tr>
<td>Cheeses</td>
<td>All forms</td>
</tr>
<tr>
<td>Eggs</td>
<td>Any cooked form</td>
</tr>
<tr>
<td>Breads</td>
<td>White, rye without seeds, refined whole wheat; corn bread; any cracker not made with whole grains; French toast made from permitted breads; spoon bread; pancakes, plain soft rolls</td>
</tr>
<tr>
<td>Cereals</td>
<td>All cooked, soft varieties; puffed flakes and noncoarse ready-to-eat varieties</td>
</tr>
<tr>
<td>Flour</td>
<td>All forms</td>
</tr>
<tr>
<td>Meats, fish, poultry</td>
<td>Small cubed and finely ground or minced forms; as ingredients in creamed dishes, soups, casseroles, and stews</td>
</tr>
<tr>
<td>Seafoods</td>
<td>Any variety of fish without bone (canned, fresh, or frozen; packaged prepared forms in cream sauces); minced, shredded, ground, and finely chopped shellfish</td>
</tr>
<tr>
<td>Legumes, nuts</td>
<td>Fine, smooth, creamy peanut butter; legumes (if tolerated) cooked tender, finely chopped, mashed, or minced</td>
</tr>
<tr>
<td>Potatoes</td>
<td>White potatoes: mashed, boiled, baked, creamed, scalloped, cakes, au gratin; sweet potatoes: boiled, baked, mashed</td>
</tr>
<tr>
<td>Soups</td>
<td>All varieties; preferably without hard solids such as nuts and seeds</td>
</tr>
<tr>
<td>Fruits</td>
<td>Raw: avocado, banana; cooked and canned: fruit cocktail, cherries, apples, apricots, peaches, pears, sections of mandarin oranges, grapefruits, or oranges without membranes; all juices and nectars</td>
</tr>
<tr>
<td>Vegetables</td>
<td>All juices; all vegetables cooked tender, chopped, mashed, canned, or pureed; canned, pureed, or paste forms of tomato</td>
</tr>
<tr>
<td>Sweets</td>
<td>Marshmallow and chocolate sauces; preserves, marmalade, jelly, jam; candy; hard, chocolate, caramels, jellybeans, marshmallows, candy corn, butterscotch, gumdrops, plain fudge, lollipops, fondant mints; syrup: sorghum, maple, corn; sugar: granulated, brown, maple, confectioner's; honey, molasses</td>
</tr>
<tr>
<td>Desserts</td>
<td>All plain or certain flavored varieties (permitted ingredients include liquids, such as juice; finely chopped or pureed fruits without solid pieces of fruit, seeds, nuts, etc.); gelatins, puddings; ice cream, ice milk, sherbet; water ices; cakes, cookies, cake icing; cobblers</td>
</tr>
<tr>
<td>Fats</td>
<td>Butter, margarine, cream (or substitutes), oils and vegetable shortenings, and bacon fat; salad dressings, tartar sauce, sour cream</td>
</tr>
<tr>
<td>Seasonings</td>
<td>Salt, pepper, soy sauce, vinegar, catsup; all other herbs, especially finely chopped or ground, that can be tolerated</td>
</tr>
<tr>
<td>Food Types</td>
<td>Foods Permitted</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Milk</td>
<td>All milk and milk products without added ingredients; condensed and evaporated</td>
</tr>
<tr>
<td></td>
<td>milk, chocolate milk and drink; cocoa and hot chocolate; yogurt and whey</td>
</tr>
<tr>
<td>Cheese</td>
<td>Cottage cheese, cream cheese, mild cheese, and any cheese not prohibited</td>
</tr>
<tr>
<td>Eggs</td>
<td>Poached, scrambled, soft- and hard-cooked eggs; salmonella-free egg powder</td>
</tr>
<tr>
<td></td>
<td>(pasteurized)</td>
</tr>
<tr>
<td>Breads and equivalents</td>
<td>Breads: white, Italian, Vienna, French,</td>
</tr>
<tr>
<td></td>
<td>refined whole wheat, corn bread, spoon bread, French toast, seedless rye;</td>
</tr>
<tr>
<td></td>
<td>muffins, English muffins, pancakes, rolls, waffles; melba toast, rusk, zwieback;</td>
</tr>
<tr>
<td></td>
<td>biscuits, graham crackers, saltines, and other crackers not made with whole</td>
</tr>
<tr>
<td></td>
<td>grains</td>
</tr>
<tr>
<td>Cereals</td>
<td>Cooked and refined dry cereals</td>
</tr>
<tr>
<td>Flours</td>
<td>All varieties except those prohibited</td>
</tr>
<tr>
<td>Beverages</td>
<td>All types</td>
</tr>
<tr>
<td>Meat, fish, poultry</td>
<td>Meats: beef, liver, pork (lean and fresh), lamb, veal, poultry; turkey, chicken;</td>
</tr>
<tr>
<td></td>
<td>duck, Cornish game hens, chicken livers; fish: all types of fresh varieties,</td>
</tr>
<tr>
<td></td>
<td>canned tuna and salmon</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Legumes, nuts</td>
<td>Fine, creamy, smooth peanut butter</td>
</tr>
<tr>
<td>Fruits</td>
<td>Raw: avocado, banana; canned or cooked: apples, apricots, cherries, peaches,</td>
</tr>
<tr>
<td></td>
<td>pears, plums, sections of oranges, grapefruits, mandarin oranges without</td>
</tr>
<tr>
<td></td>
<td>membranes, stewed fruits (except raisins), fruit cocktail, seedless grapes;</td>
</tr>
<tr>
<td></td>
<td>all juices and nectars</td>
</tr>
<tr>
<td>Vegetables</td>
<td>All juices; canned or cooked: asparagus, beets, carrots, celery, eggplant,</td>
</tr>
<tr>
<td></td>
<td>green or wax beans, chopped kale, mushrooms, peas, spinach, squash, shredded</td>
</tr>
<tr>
<td></td>
<td>lettuce, chopped parsley, green peas, pumpkin; tomato; stewed, pureed, juice,</td>
</tr>
<tr>
<td></td>
<td>paste</td>
</tr>
<tr>
<td>Fats</td>
<td>Butter, margarine, cream (or substitute), oil, vegetable shortening,</td>
</tr>
<tr>
<td></td>
<td>mayonnaise, French dressing, crisp bacon, plain gravies, sour cream</td>
</tr>
<tr>
<td>Soups</td>
<td>Any made from permitted ingredients:</td>
</tr>
<tr>
<td></td>
<td>bouillon (powder or cubes), consommé, cream soups; strained soups: gumbo,</td>
</tr>
<tr>
<td></td>
<td>chowders, bisques</td>
</tr>
<tr>
<td>Potatoes</td>
<td>White potatoes: scalloped, boiled, baked, mashed, creamed, au gratin; sweet</td>
</tr>
<tr>
<td></td>
<td>potatoes: mashed</td>
</tr>
<tr>
<td>Rice and equivalents</td>
<td>Rice (white or brown), macaroni, spaghetti, noodles, Yorkshire pudding</td>
</tr>
<tr>
<td>Sweets</td>
<td>Sugar: granulated, brown, maple, confectioner's; candy: mints, butterscotch,</td>
</tr>
<tr>
<td></td>
<td>chocolate, caramels, fondant, plain fudge; syrups: maple, sorghum, corn; jelly,</td>
</tr>
<tr>
<td></td>
<td>marmalade, preserves, jams; honey, molasses, apple butter; chocolate sauces</td>
</tr>
</tbody>
</table>

continues
TABLE 14-2 (continued)

<table>
<thead>
<tr>
<th>Food Types</th>
<th>Foods Permitted</th>
<th>Foods Prohibited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desserts</td>
<td>Cake, cookies, custard, pudding, gelatin, ice cream, cobblers, ice milk, sherbet, water ice, cream pie with graham cracker crust; all plain or flavored without large pieces of fruits</td>
<td>Any products containing nuts, coconut, or prohibited fruits</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Sauces: cream, white, brown, cheese, tomato; vinegar, soy sauce, catsup; all finely ground or chopped spices and herbs served in amounts tolerated by the patient</td>
<td>Spices and sauces that the patient is unable to tolerate, such as red pepper, garlic, curry, mustard; pickles; olives; popcorn, potato chips, Tabasco and Worcestershire sauces</td>
</tr>
</tbody>
</table>

*Cooked tender—may be broiled, baked, creamed, stewed, or roasted.

TABLE 14-3 Sample Menu for a Fiber-Restricted Diet

<table>
<thead>
<tr>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange juice, ½ c</td>
<td>Tomato soup, ½ c</td>
<td>Soup, creamed, ½ c*</td>
</tr>
<tr>
<td>Farina, ½ c</td>
<td>Cod, broiled, 2–3 oz</td>
<td>Beef, stew meat, tender, 3–4 oz</td>
</tr>
<tr>
<td>Egg, soft-boiled, 1*</td>
<td>Potato, baked, medium, 1</td>
<td>White rice, ½ c</td>
</tr>
<tr>
<td>Bacon, crisp, 2 strips*</td>
<td>Toast, 1 slice</td>
<td>Asparagus, canned, ½ c</td>
</tr>
<tr>
<td>Toast, 1 slice</td>
<td>Butter or margarine, 1 tsp</td>
<td>Toast, 1 slice</td>
</tr>
<tr>
<td>Butter or margarine, 1 tsp</td>
<td>Pudding, plain, ½ c</td>
<td>Butter or margarine, 1 tsp</td>
</tr>
<tr>
<td>Jam, 1–3 tsp</td>
<td>Coffee or tea, 1–2 c</td>
<td>Gelatin, flavored, ½ c</td>
</tr>
<tr>
<td>Milk, 1 c</td>
<td>Sugar, 1–3 tsp</td>
<td>Coffee or tea, 1–2 c</td>
</tr>
<tr>
<td>Coffee or tea, 1–2 c</td>
<td>Cream, 1 tbsp*</td>
<td>Cream, 1 tbsp*</td>
</tr>
<tr>
<td>Sugar, 1–3 tsp</td>
<td>Salt, pepper</td>
<td>Sugar, 1–3 tsp</td>
</tr>
<tr>
<td>Cream, 1 lbs*</td>
<td></td>
<td>Salt, pepper</td>
</tr>
<tr>
<td>Salt, pepper</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Egg, bacon, and cream may be omitted to lower the fat content of the diet.

The primary objective of the diet is to relieve thirst and to help maintain water balance. Broth provides some sodium, and fruit juices contribute potassium. The inclusion of carbonated beverages, sugar, and fruit juices furnishes a small amount of carbohydrate. This diet is deficient in nutrients and provides about 600 calories per day. Severe malnutrition results from an extended use of this diet. A sample menu for a clear-liquid diet is shown in Table 14-4.

DIET FOR DYSPHAGIA

The dysphagia diet changes the texture of foods. It is used for those clients who have difficulty swallowing, for example, those with partial paralysis of the throat following a CVA (stroke), or patients undergoing radiation treatment for neck and throat cancers. The diet reduces the risk of food going into the trachea and getting into the lungs. It also makes it easier to chew and move food around in the mouth. Liquids are particularly difficult to swallow. Any liquids are thickened to a semisolid consistency. Table 14-5 describes the types of foods suitable for a patient with dysphagia.

PROGRESS CHECK ON ACTIVITY 2

MULTIPLE CHOICE

Circle the letter of the correct answer.

1. The clear-liquid diet:
   a. replaces lost body fluids.
   b. provides a nutritionally adequate diet.
   c. includes any food that pours.
   d. is never used after surgery.

2. Which of the following groups of food would be allowed on a clear-liquid diet?
   a. strained cream of chicken soup, coffee, and tea
   b. tomato juice, sherbet, and strained cooked cereal
   c. raspberry ice, beef bouillon, and apple juice
   d. tea, coffee, and eggnog
224 PART III NUTRITION AND DIET THERAPY FOR ADULTS

3. The dysphagia diet:
   a. is of semisolid consistency.
   b. is followed by clear-liquid diet.
   c. does not include milk in any form.
   d. is given to patients with acute respiratory infections.

4. The dysphagia diet:
   a. may contain mild spices.
   b. includes no protein foods.
   c. includes no commercial supplements.
   d. is commonly given immediately after surgery.

5. The protein content of the dysphagia diet:
   a. can be increased by adding lactose to beverages.
   b. can be increased by adding dried milk to mashed potatoes.
   c. cannot be varied.
   d. is always adequate.

6. The clear-liquid diet:
   a. is given to all patients with chewing difficulties.
   b. may be used after surgery.
   c. includes milk foods.
   d. is nutritionally adequate.

7. The mechanically altered diet:
   a. is a standard diet in health facilities.
   b. is always served to children under 12 years old.
   c. is similar to a high-residue diet.
   d. does not nourish as well as a regular diet.

8. A major difference between the regular and the fiber-restricted diet is the:
   a. nutrient content.
   b. texture of the foods.
   c. energy values.
   d. satiety value of the food.

9. It is not unusual for the fiber-restricted diet to be:
   a. ordered to precede the clear-liquid diet.
   b. ordered for a patient with dysphagia.
   c. ordered to succeed the clear-liquid diet.
   d. used in place of the clear-liquid diet.

10. Which of the following foods would not be included in a fiber-restricted diet?
    a. ground beef
    b. leg of lamb
    c. roast chicken
    d. grilled pork chops

11. Cellulose is:
    a. a complete protein.
    b. an indigestible carbohydrate.
c. a saturated fat.
d. an essential mineral.

12. Texture of food refers to its:
   a. color.
   b. flavor.
   c. consistency.
   d. satiety value.

13. Which of the following groups of food would be allowed on the dysphagia diet?
   a. coffee, bananas, and sponge cake
   b. salt, sherbet, and scrambled eggs
   c. butter, angel food cake, and fried chicken
   d. ginger ale, chocolate ice cream, and cocoa with marshmallows
   e. none of the above

FILL-IN

14. Adapt the following menu to meet the needs of a patient on a fiber-restricted diet: fresh fruit cup, oatmeal with milk and sugar, bran muffin, and butter.

15. Indicate which of the following foods would be allowed on a fiber-restricted diet by writing Y (yes) and N (no):
   a. banana nut bread
   b. roast chicken breast
   c. baked halibut
   d. french fried potatoes
   e. angel food cake
   f. black coffee
   g. celery sticks
   h. tapioca pudding
   i. coconut cookies
   j. tossed salad

ACTIVITY 3: Diet Modifications for Therapeutic Care

The underlying concept in planning a therapeutic diet is that it is based on a normal balanced diet. The regular or house diets used during acute care can be modified to meet specific conditions, since they are already balanced diets. In addition to meeting specific needs, the changes that may be required must take into account many specific factors affecting the patient.

The modifications most generally used deal with four aspects of foods: basic nutrients, energy value, texture or consistency, and seasonings.

MODIFYING BASIC NUTRIENTS

The quantity and quality of the protein, fat, carbohydrate, vitamins, water, and minerals in a diet may be modified. An increase is used to correct deficiencies or provide extra nutrients for repair of body tissue. The increase may involve one or more nutrients, but combinations are frequent, since all nutrients have interrelated functions. Examples are a high-protein, high-carbohydrate, and high-vitamin diet for postoperation and an iron-rich diet for iron-deficiency anemia. The diet for a malnourished patient upon admission to the hospital may require increases in all the nutrients. A nutrient-rich diet is not necessarily accepted by the patient. The patient with a chronic, debilitating illness may be anorexic and present quite a challenge to the health team.

Nutrients may be reduced in a diet because the patient can metabolize only a certain amount. For example, a person with high blood sugar requires a diet low in simple carbohydrate. High serum lipids require a low-fat diet. When a diseased kidney cannot excrete excess minerals, a reduced intake of minerals is prescribed, as well as a monitored fluid intake.

MODIFYING ENERGY VALUE

The calculated diet is used to adjust caloric intake to regulate body weight. Calculations are based on the caloric value of foods which is the number of calories per gram a food will furnish when metabolized by the body. Adjustments are made in the amounts of carbohydrate, protein, and fat contained in the diet. For example, an underweight patient may need a 3000-calorie diet while an overweight patient may need only 1500 calories. The diabetic diet is also a calculated diet. The nutrient values are calculated individually in order to ensure that daily requirements for each are met. A 1000-calorie diet containing only fat and carbohydrate can be developed, if there is no concern for nutrient adequacy. Patients with certain malabsorptive disorders may require diets with increased energy value along with adjustments in the amount of a specific nutrient.

MODIFYING TEXTURE OR CONSISTENCY

Modification of foods' texture or consistency is used to: provide ease of chewing, swallowing, or digestion; rest the whole body or an affected organ; and bring a patient back to a regular diet. It is widely used in combination with other modifications. Patients with gastrointestinal diseases or trauma to the mouth and throat frequently are given diets altered in texture. Postsurgery patients may progress from liquid to regular diets, as tolerated. Patients with heart disorders may be prescribed diets altered in texture to ease digestion to rest the damaged heart.

The dysphagia diet may be utilized to fill a variety of needs for patients requiring alterations in texture.
MODIFYING SEASONINGS

Seasonings are usually adjusted to individual tolerances, but a few are not advised in certain diseases. Salt restriction is prescribed for various conditions, including sodium retention in the body, edema, ascites, and others.

Whatever the modification, the goal of diet therapy remains the same: to restore and maintain good nutritional status. Nutrient supplements of vitamins, minerals, and high-protein formulas are needed for highly restricted diets, anorexia, and impaired absorption and metabolism.

A planned diet is successful only when it is eaten. The diet must be individualized to take into account the psychological and cultural factors that influence food acceptance. In addition, the food must be attractively presented, palatable, and safe. The patient’s environment at mealtime is also an important factor, as is the attitude of the individuals serving the meals.

NURSING IMPLICATIONS

1. Recognize the unique position of the nurse in promoting dietary compliance to modified diets:
   a. Assess nutritional status.
   b. Observe and document nutritional intake.
   c. Evaluate response to diet therapy.
   d. Teach or support the diet teaching and diet therapy ordered for the client.

2. Be aware that diet therapy, alone or in conjunction with other treatment, may play an important role in the prevention and treatment of disease by:
   a. lessening severity of symptoms.
   b. decreasing need for medication.
   c. delaying onset of disease or delaying progression.
   d. increasing resistance to diseases or speeding recovery.

3. Provide the client and caregivers with nutrition information, encouragement, education, and referrals as needed.

4. Recognize the social, cultural, and psychological aspects that influence nutritional status of hospitalized clients and intervene when needed.

5. Continue to update knowledge regarding diet therapy.

PROGRESS CHECK ON ACTIVITY 3

FILL-IN

1. What are the four basic modifications made in a diet?
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________

2. Give an example and the rationale for decreasing a nutrient in the diet. ____________________________

3. Name three situations where diet supplementation would be needed:
   a. ____________________________
   b. ____________________________
   c. ____________________________

4. Explain how a diet can be individualized and still provide the correct modifications. ____________________________

ACTIVITY 4:

Alterations in Feeding Methods

It is estimated that protein energy malnutrition (PEM) is present in 25%–50% of all medical surgical patients. The most common reason is exhausted nutrient reserves when entering a facility. In addition, hospitalized patients who were previously stable can experience malnutrition in as little as two weeks.

Of particular significance are those patients at high risk for whom oral feedings are inadequate, such as being on five days or more of clear liquids. Other high-risk patients who may require alternate feeding methods are those with eating disorders, malabsorption syndromes, cancer, or a hypermetabolic condition such as burns. Whenever a patient cannot or will not eat, for any one of myriad reasons, an alternate method of feeding should be employed.

There are two parenteral or intravenous feeding methods. One method injects nutrients into the blood via a peripheral vein (for example, a vein in the arm, near the surface). The other method injects nutrients into the blood via a central vein (those deeper into the central portion of the system; for example, the subclavian located under the collarbone).

SPECIAL ENTERAL FEEDINGS

Enteral (tube) feedings are used only for patients who have enough functioning of the GI tract to digest and absorb their food. They are also used when the patient cannot eat enough regular food to promote healing, even though the GI tract is functional. Frequently, an oral supplement has been added to the diet (such as Ensure from Ross Laboratories) before tube feedings are considered, but it has been insufficient. After careful assessment of
nutritional status, tube feedings are added as an additional supplement. Tube feedings must be provided that meet the individual patient’s needs. Many new commercial modular formulas are available.

A tube feeding is a nutritionally adequate diet of liquified foods administered through a tube into the stomach or duodenum. These foods are commercially available. From the standpoint of accuracy in measuring, sanitation, and convenience, most hospitals prefer commercial mixtures. These mixtures can be milk-based formulas, lactose-free formulas, meat-based formulas, and residue-free formulas. Tube feedings usually furnish one calorie per milliliter. A 24-hour intake of three liters would furnish 3000 calories.

Enteral feedings have several advantages, including the following:
1. It is more economical to feed enterally than intravenously, considering equipment, time, and foods used.
2. It is safer to feed enterally than intravenously. The risk of fluid and electrolyte imbalances and infection is less than for intravenous feedings.

Some disadvantages of enteral feedings include the following:
1. Nutritional inadequacy for certain patients (not enough protein and calories)
2. Overnutrition for certain patients (excess calories and formula)
3. Diarrhea or constipation
4. Vomiting
5. Problems of preparation and safety. Bacterial contamination can be a factor if preparation is not carefully controlled.
6. Home-prepared tube feedings are not recommended. Prepared formulas are preferred over the use of home-blenderized diets, which can clog tubes, are not sterile, and in which nutrient composition is not well defined.

Depending on the patient and the circumstances, some or all of the above problems can be avoided or remedied.

There is an increasing movement back toward use of more enteral feedings. Recent studies indicate that the intestinal bacteria will translocate to other areas, become pathogenic, and create sepsis when they are not fed.

Enteral feedings depend on enteral formulas. There are three categories of commercial enteral formulas:
1. Standard, intact, or routine enteral formulas
2. Elemental or defined enteral formulas
3. Disease-specific enteral formulas

Standard enteral formulas have existed for many years with a few commercial products coming to the market 30 years ago. Now, there are more than 35 products in the market. They are used for routine feedings for patients who need them as prescribed by physicians. Each product is made of regular foods and individual nutrients.

Defined enteral formulas contain specific nutrients or modified nutrients, including simple and complex carbohydrates, amino acids, peptides, fatty acids, triglycerides, and so on. There are about 15 or so in the market.

Disease-specific enteral formulas are available for five or more clinical disorders such as those of the kidney, liver, pancreas (diabetes), lung, and the immune system.

There are four companies that manufacture most of the products although some smaller companies manufacture one or two of these formulas. Table 14-6 describes the type of enteral formulas and the companies manufacturing them.

**PARENTERAL FEEDINGS VIA PERIPHERAL VEIN**

Nutrient fluids entering a peripheral vein can be saline with 5%–10% dextrose (clinically represented by D5W or D10W); amino acids; electrolytes; vitamins; and medications. Intravenous fluids may be either isotonic, hypotonic, or hypertonic. Both hypotonic and hypertonic solutions create a shift in body fluids. Hypotonic solutions draw fluid from the blood vessels into the interstitial spaces and cells. Hypertonic solutions create the opposite effect; they draw fluids out of interstitial spaces into the blood.

When enteral feedings are contraindicated, feeding by a peripheral vein is often used. This type of feeding is safer than feeding by a central vein, but it fails to provide adequate calories and other nutrients for repair and replacement of losses. The dangers of overloading with fluid in order to meet caloric needs are inherent in using solutions via the peripheral vein. Some examples of nutrient quantities in these solutions will illustrate the clinical problem. For example, 2500 cc of D5W provides 425 calories and 0 g protein; 200 cc of 3.5% amino acid solution provides 70 g protein, 280 calories, but 0 g carbohydrate to spare protein. A 10% fat emulsion (intralipids) may be used via the peripheral vein) furnishes 1 calorie per 1 cc emulsion, contains no amino acids, and is not compatible with any other added nutrients. It elevates serum cholesterol levels and is questionable in its ability to promote nitrogen balance by sparing protein.

**PARENTERAL FEEDING VIA CENTRAL VEIN (TOTAL PARENTERAL NUTRITION [TPN])**

When a patient is severely depleted nutritionally or if the GI tract cannot be used, parenteral feeding via a catheter inserted into a central vein (usually the subclavian to the superior vena cava) can provide adequate nutrition. The solution for TPN is a sterile mixture of glucose, amino acids, and micronutrients. The intralipids are not given.
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in this solution and may be administered via a peripheral vein. The amounts of micronutrients added are based on the individual’s blood chemistry. Multivitamin preparations can be added to the TPN solutions, except for B12, K, or folic acid, which are given separately.

TPN has many advantages. It can be used for long periods of time to meet the individual body’s total nutritional needs. The solutions can be adjusted according to individual needs by increasing or decreasing any or all of the nutrients.

TPN also has many disadvantages. The solutions are very expensive, and they support rapid growth of bacteria and fungi. The rate of infusion must be adhered to rigidly, around the clock. Dressing changes are done using sterile technique. Careful monitoring of the patient’s response and corrective measures when needed are mandatory for safe administration of these solutions.

NURSING IMPLICATIONS

The responsibilities or implications for nutritional support by the nursing staff are varied and many. A brief summary of some of these implications follows:

1. Discard all unused, cloudy, or sedimnted fluids.
2. Do not add drugs and other mixtures to a solution containing protein.
3. Refrigerate solutions until they are used.
4. Be aware that dates should be on tube feedings, and that they should not be given past 24 hours of date.
5. Be alert for signs of gas, regurgitation, cramping, and diarrhea, and be prepared to intervene.
6. Take necessary precautions when using nutrient solutions because they are excellent sources for bacterial growth.
7. Be especially alert for signs of hypo- or hyperglycemia when TPN is used and intervene if necessary.
8. Assist the patient in adjusting to an alternate feeding method. Many patients experience stress due to fear and concern of unfamiliar feeding methods.
9. Encourage and practice good oral hygiene measures with the patient, even though he or she is not eating by mouth.
10. Encourage early ambulation, which makes use of the muscles and increases the use of calcium and protein. Physical activity also raises morale.

Multiple Choice

1. Which of the following is an important concern for the nurse who is providing nutrition by peripheral vein?
   a. calorie overload
   b. contamination of the injection site
   c. fluid overload
   d. all of the above

2. The solution used for TPN consists of:
   a. glucose, amino acids, and micronutrients.
   b. glucose, amino acids, and fatty acids.
   c. 10% dextrose in saline and vitamins.
   d. commercial hydrolyzed mixtures.

3. Which of the following vitamins would need to be given separately instead of added to a formula?
   a. thiamin, niacin, and riboflavin
   b. the fat-soluble vitamins
   c. B12, K, and folic acid
   d. none of the above

True/False

4. T F Nutrient fluids via peripheral vein are as adequate for long-term feedings as those via central vein.
5. T F Tube feedings are always commercial preparations.
6. T F Parenteral feedings will sustain the fluid and electrolyte balance of a postoperative patient.
7. T F TPN can be used for long periods of time and still maintain cell integrity.
8. T F Enteral feedings are more likely to become contaminated than parenteral ones.

Matching

Match the statement to the appropriate fluid.

9. Draws fluid from interstitial spaces into the blood. a. isotonic fluid
   b. hypotonic fluid
   c. hypertonic fluid

10. Does not create a fluid shift. a. isotonic fluid

11. Draws fluid from blood into interstitial spaces.

Fill-in

12. Define tube feedings. ____________________________________________________________________________

13. List two advantages and two disadvantages of enteral feeding.
   a. ______________________________________________________________________________________
   b. ______________________________________________________________________________________

14. List two conditions requiring TPN.
   a. ______________________________________________________________________________________
   b. ______________________________________________________________________________________
15. List three important nursing measures for a patient receiving TPN.

a. ____________________________

b. ____________________________

c. ____________________________

16. List three types of formulas used in tube feedings and describe the major difference of each from the other.

a. ____________________________

b. ____________________________

c. ____________________________

References


CHAPTER 15

Diet Therapy for Surgical Conditions

Time for completion
Activities: 1 hour
Optional examination: ½ hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:

1. Identify the physiological and psychological effects of body trauma or stress.
2. Contrast the outcomes of surgery in a patient with poor nutritional status and in a patient with good nutritional status.
3. Explain the rationale for the importance of the nutrients most needed during the surgical experience.
4. List the major nutritional problems encountered in preoperative patients and possible solutions to these problems.
5. Describe the diet therapy regime for the postoperative patient and rationale for its use.
6. Identify common foods and fluids suitable for replacing losses and promoting healing in the surgical patient.
7. Relate nursing interventions to the nutritional care of the surgery patient.

GLOSSARY

Acidosis: an accumulation of excess acid or depleted alkaline reserve (bicarbonate content) in the blood and body tissues. It almost always occurs as part of a disease process.
Ambulatory: able to walk; not confined to bed.
Calcification: process in which organic tissue becomes hardened by deposition of lime salts in the tissues.
Capillary walls: the sides of the minute blood vessels (capillaries). Capillaries connect the smallest arteries with the smallest veins.
Coenzymes: enzyme activators, such as vitamins, that enter into a variety of body processes.
Collagen: the protein in connective tissue and bone matrix.
Colloidal osmotic pressure: the pressure that develops on either side of a membrane. The colloid does not pass through the membrane, so therefore keeps the concentration of the solution approximately equal to that of circulating blood. The colloidal substance is a protein; therefore, when protein in the diet is depleted, edema develops because the solution can then pass from inside the membrane into the tissues.
Connective tissue: fibrous insoluble protein that holds cells together; collagen represents approximately 30% of body protein.
Decubitis ulcers: inflammation, sore, or ulcer over a bony prominence (exercise, movement, good skin care, and a high-protein, high-vitamin diet are needed for prevention).
Dehiscence: splitting open; separation of all the layers of a surgical wound.
Dehydration: the loss or deprivation of water from the body or tissues.
Diabetes: increased excretion of urine.
Duodenum: the first portion of the small intestine extending from the pylorus to the jejunum. It is about 10 inches long and both the common bile duct and pancreatic duct empty into it.
Edema: swelling; the body tissues contain an excess amount of tissue fluid.
Enteral nutrition: the feeding by way of the small intestine.
Peristalsis: the wormlike movement by which the alimentary canal propels its contents, consisting of a wave of contractions passing along the tube.
Plasma protein: the liquid part of the blood and lymph is the plasma. Plasma contains numerous chemicals and protein, glucose, and fats. Protein in plasma prevents undue leakage of fluids out of the capillaries.
Prothrombin: a chemical substance in the blood that interacts with calcium salts to produce thrombin, which clots blood.
Superior vena cava: the principal vein draining the upper portion of the body. Formed by the junction of right and left innominate veins, it empties into the right atrium of the heart.

**BACKGROUND INFORMATION**

The nutritional status of the patient before, during, and after surgery is important to a rapid and successful recovery. Factors affecting pre- and postoperative conditions are introduced below.

**Effects of Stress**

All kinds of stress or trauma deplete body stores and interfere with ingestion, digestion, and metabolism. Injury, accidents, trauma, burns, cancer, illness, fever, infections, loss of blood and other fluids, loss of body tissues, and other conditions requiring surgery can significantly deplete body substances in a patient. Such injuries or stress require an increased amount of nutrients for repair. These problems are usually compounded by psychological stress such as anxiety, fear, and pain, which greatly interfere with the desire or ability to eat.

During periods of stress there may be reduced function of the gastrointestinal (GI) tract. Muscular activity is lowered in the digestive tract. This may cause abdominal distention, gas pains, and constipation. In some cases, the nervous system may be stimulated by these conditions, resulting in nausea, vomiting, and diarrhea. Prolonged stress results in depleted liver glycogen and the wasting of muscle tissue.

**Effects of Nutrition**

Good nutrition prior to surgery leads to effective wound healing, increases resistance to infection, shortens convalescence, and lowers the mortality rate.

Poor nutrition prior to surgery leads to poor wound healing, dehydration, edema, excessive weight loss, decubitis ulcers, increased infections, potential liver damage, and a high mortality rate.
Most patients are not at optimum nutritional status when they are admitted to a healthcare facility. If surgery is to be performed, the patient’s nutritional status must be improved by an appropriate dietary regimen prior to surgery. This minimizes surgical risk. Unfortunately, this is not always possible due to the acute need for surgery. Some also believe that such consideration is given low priority because of poor hospital practice, limited staffing, lack of communication, relatively low urgency, and so on.

**Nutrients for the Surgical Experience**

The following are nutrients considered important for persons undergoing surgery:

1. **Protein** is needed to build and repair damaged tissue.
2. **Carbohydrate and fat** are needed to spare protein and furnish energy.
3. **Glucose** is necessary to prevent acidosis and vomiting.
4. **Vitamins:**
   a. Vitamin C is required to hasten wound healing and collagen formation.
   b. Vitamin B complex is needed to form the coenzymes for metabolism, especially of carbohydrates.
   c. Vitamin K is needed to promote blood clotting.
5. **Minerals:**
   a. Zinc is needed to aid wound healing.
   b. Iron is needed to permit hemoglobin synthesis to replace blood loss.

**Surgery Outcome**

There is strong evidence that nutrition plays an important role in the outcomes of surgical cases. Some recent clinical findings are listed below.

1. In a National Veterans Affairs Surgical Risk Study of 87,000 noncardiac surgical cases, nutrition played an important role in surgical success. The preoperative serum albumin levels, an indicator of nutritional status, were the strongest predictors of patients who would show complications or die within 30 days.
2. A Veterans Affairs study found that malnourished patients who received postsurgical total parenteral nutrition support had fewer noninfectious complications than controls.
3. One study found that the number of days in the ICU and days on a ventilator were highest among those patients that did not receive postoperative enteral feeding. Length of hospital stay, infectious complications, hospital costs, and antibiotic usage were highest in the study’s “unfed” group.
4. In a study of 300 patients undergoing major surgical procedures, malnutrition was associated with increased rates of morbidity and mortality.
5. A report by the National Institutes of Health, the American Society for Parenteral and Enteral Nutrition, and the American Society for Clinical Nutrition advocates the nutrition assessment of surgical patients via laboratory and physical data in combination with a subjective global assessment (SGA). The SGA encompasses food intake, malabsorption, and malnutrition and is useful in determining the effects of malnutrition on organ function and body composition.

**Progress Check on Background Information**

**MULTIPLE CHOICE**

Circle the letter of the correct answer.

1. Effects of stress on the body include all except:
   a. stimulation of the desire to eat.
   b. depletion of body tissues.
   c. depressed GI functioning.
   d. decreased liver glycogen.

2. Poor nutrition prior to surgery may result in all of the following except:
   a. increased resistance to infection.
   b. dehydration.
   c. edema.
   d. liver damage.

**FILL-IN**

List four effects of good nutritional status on the outcome of surgery.

3. __________________________
4. __________________________
5. __________________________
6. __________________________

**MATCHING**

Some nutrients have been identified as being very important in the surgical experience. Match the nutrient at the left with the letter of its major function at the right.

7. Glucose
   a. builds and repairs tissue
8. Vitamin C
   b. blood clotting
9. Protein
   c. synthesis of hemoglobin
10. B complex
   d. aids in wound healing and collagen formation
11. Iron
   e. prevents acidosis and vomiting
12. __________________________
13. __________________________
14. __________________________
15. __________________________
16. __________________________

Match the word with its definition.

12. Dehiscence
   a. excessive urine
13. Evisceration
   b. connective tissue
14. Collagen
   c. between the cells
15. Interstitial
   d. splitting open
16. Diuresis
   e. disembowelment
TRUE/FALSE
Circle T for True and F for False.

17. T F Physical stress reduces functioning of all body organs.

18. T F Psychological stress depletes body stores.

19. T F If the patient is not fed orally he or she won't get edema and ascites.

20. T F Most patients have adequate nutritional status prior to surgery.

21. T F The postoperative serum albumin level is the strongest predictor of patients who show complications or die within 30 days.

22. T F The number of days in ICU and days on a ventilator probably is the highest among patients that did not receive postoperative enteral feeding.

23. T F Malnutrition is not related to increased rate of morbidity and mortality.

24. T F Subjective global assessment (SGA) encompasses food intake, maldigestion, and malabsorption and is useful in determining the effects of malnutrition on organ function and body composition.

ACTIVITY 1:
Pre- and Postoperative Nutrition

PREOPERATIVE NUTRITION

The major nutritional problems in the preoperative period are undernutrition and overnutrition. Both the undernourished and obese patients present special needs.

The undernourished patient, because of a lack of the major nutrients necessary for recovery, is at higher risk in surgery than a patient of normal weight. Protein deficiency is most common among these patients. Low protein storage will predispose the patient to shock, less detoxification of the anesthetic agent by the liver, increased edema at the incision site, and decreased antibody formation. The last factor increases the risk of infection. Intravenous feeding of solutions that are more concentrated in nutrients prior to surgery is one way to replenish nutrient storage. This assumes that surgery can be postponed for a time. Aggressive oral nutrition, although more time consuming, can accomplish the same goals.

Obese patients are at higher health risk in surgery than those of normal weight. Excess fat complicates surgery, puts a strain on the heart, increases the risk of infection and respiratory problems, and delays healing. The risks of dehiscence and evisceration are greater in the obese patient. Preexisting conditions such as hypertension and diabetes, which are prevalent in obese persons, also increase risks. There is no quick way for an obese person to safely lose weight prior to surgery. If time permits, a low-calorie diet, high in the essential nutrients, should be attempted. Starvation or fad diets are obviously not recommended preoperatively. Conversely, a reduction diet after surgery is not in the patient’s best interest when the need for all nutrients is high. If weight loss is needed, a low-calorie diet should not be instituted until healing is complete.

Dietary considerations for an adequately nourished patient prior to surgery are also important. The special nutritional needs of surgical interventions should be met. The preoperative diet for these persons should be rich in carbohydrate, protein, minerals, vitamins, and fluids. This diet will assist in a rapid recovery as it promotes wound healing and decreases the risk of infections and other complications.

If a patient has preexisting conditions—for example, diabetes—the blood sugar should be stabilized before surgery. Other problems such as anemia, dehydration, acidosis, or electrolyte imbalances should be corrected before the surgical procedure.

POSTOPERATIVE NUTRITION

The goal of postoperative diet therapy is to replace body losses as soon as possible. Energy, protein, and ascorbic acid are major factors in achieving rapid wound healing. Fluid replacement is another major concern. Minerals and other vitamins also play a vital role in recovery.

The postoperative diet may be liquid, soft, or of regular consistency, but it must be high in calories, protein, vitamins, minerals, and fluids.

RATIONALE FOR DIET THERAPY

Protein

100–200 grams of high-quality protein per day are needed:

1. Up to 1 pound of tissue protein per day may be lost through bleeding, high metabolic rate (using protein for energy), from exudate, and catabolism of muscle tissue as well as from surgery itself.

2. Plasma protein loss from hemorrhage or wound bleeding may occur. Loss of plasma protein and blood volume increases the risk of shock. Extra protein is required to replace these losses.

3. Fever and inflammation that may accompany surgery can be reduced by an increased supply of protein.

4. When antibody production decreases, infections increase. A high protein intake can reduce the risk of infection.

5. Edema may develop due to an imbalance of colloidal osmotic pressure. Serum protein levels must be increased to reduce edema. Edema at the incision site may also develop, slowing healing. This is another reason for protein intake.

6. Bone healing is delayed if the protein intake is not high. The bone marrow is considered a special protein that anchors minerals and favors calcification.
7. Hormones and enzymes are protein substances. A lack of protein can lower production of these vital substances.

8. In the liver, protein combines with fat for removal. This prevents fatty infiltration. Thus, increased protein can protect the body against liver damage. When a protein combines with a fat, the product is a lipoprotein.

**Fluids**

There must be sufficient fluids to replace potential losses from vomiting, fever, diuresis, drainage, and exudates. Preventing dehydration is of great importance. Up to seven liters of fluid per day may be needed. Because the body tends to retain sodium and fluid postoperatively, total fluid intake and output must be measured and recorded to assure proper fluid balance.

**Calories**

If the caloric intake in the postoperative patient is inadequate, protein will be used for energy rather than for tissue rebuilding and wound healing. More than half of ingested proteins will be used to provide energy in the absence of sufficient carbohydrates and fats. A minimum of 2800 calories per day from carbohydrates and fat must be available to spare protein for its primary purpose. Review the protein-sparing action of carbohydrates in Chapters 4 and 5. An example of protein-sparing action is if a patient has had extensive surgery that requires 250 grams of protein for tissue building and repair, the total caloric content of the diet should range from 4000 to 6000 calories.

**Vitamins**

Vitamin C availability is imperative. The role of vitamin C, as you will recall, is to supply the cementing material of connective tissue, capillary walls, and new tissue. Depending on the nature and extent of the surgery, the patient may need 6 to 20 times the RDAs/DRI.

Vitamin K is also of special concern because of its function in blood clotting. Intestinal bacteria synthesis of this vitamin is decreased because of the use of antibiotics. Any liver damage reduces prothrombin formation, which can be corrected by the presence of more vitamin K.

The need for B complex vitamins increases with rising caloric requirements. These vitamins function as coenzymes in carbohydrate and protein metabolism, the formation of hemoglobin, and the prevention of anemia.

**Minerals**

Minerals are of great importance in the replacement of electrolytes simultaneously lost with fluid from the body. The amount and kinds of minerals to be replaced are determined by the type of surgery and extent of loss in the patient. Certainly, sodium, chloride, phosphorus, potassium, and iron will need replacing and an increase in calcium supply is mandatory if bone surgery or loss is involved. Table 15-1 lists food sources of some of the most essential nutrients needed by surgical patients.

**Progress Check on Activity 1**

**MULTIPLE CHOICE**

Circle the letter of the correct answer.

1. The major nutritional problems that the health team encounters among patients scheduled for surgery are and .
   a. anxiety  b. undernutrition  c. pain  d. overnutrition

2. Low protein reserves can cause all except which of the following conditions?
   a. shock and edema  b. muscle wasting  c. anxiety  d. liver damage

3. Sufficient fluids are supplied in the diet to replace losses from all except:
   a. edema.  b. diuresis.  c. vomiting.  d. drainage.

**TRUE/FALSE**

Circle T for True and F for False.

4. T F A minimum of 1200 calories per day from carbohydrate and fat is required for protein-sparing of the postoperative patient.

5. T F The major problem in preoperative patients is under- or overnutrition.

6. T F Decreased protein increases antibody formation.

7. T F It is more important to increase total calories than carbohydrate in the preoperative diet.

**FILL-IN**

8. Using the following menu, indicate the major nutrients supplied by each food listed by placing an X in the appropriate column.

<table>
<thead>
<tr>
<th></th>
<th>Pro</th>
<th>Cho</th>
<th>Thia</th>
<th>Nia</th>
<th>Ribo</th>
<th>Fe</th>
<th>Vit C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oyster stew</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole wheat garlic toast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green pepper and cabbage slaw</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raisin rice pudding with orange sauce</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ACTIVITY 2:

The Postoperative Diet Regime

GOALS OF DIETARY MANAGEMENT

The main goal of postoperative nutritional and dietary care is for the patient to regain a normal body weight. This is brought about by a positive nitrogen balance and subsequent muscle formation and fat deposition. This goal can be achieved by first correcting all fluid and electrolyte imbalances and giving appropriate transfusions. The second step is to provide carefully planned dietary and nutritional support for the patient, with special emphasis on those nutrients discussed at the beginning of this chapter. The third step is to monitor food intake by maintaining a detailed record of what is consumed.

A postoperative dietary regimen also requires aggressive nutritional support that is needed to maintain normal body functions and tissues. Tissue maintenance is especially important since additional losses may result from postoperative bed confinement and ensuing muscle atrophy. Nutritional supports should also attempt to replace tissue (such as muscle, bone, blood, exudate, and skin) that may have been lost during the trauma of surgery. Any malnourishment should be remedied if it has not already been treated. Plasma protein should be supplied to control or prevent edema and shock. Plasma protein also provides vital components for the synthesis of albumin, antibodies, enzymes, and other necessary substances, which may have been lost through bleeding or the escape of fluids. Finally, plasma protein also accelerates the healing of wounds.

Inadequate nutritional supports increase morbidity and mortality, delay the return of normal body functions,
and retard the process of tissue rebuilding. Inadequate nutrition prevents wounds from healing at a normal pace and causes edema and muscular weakness. Most importantly, all of these consequences prolong convalescence and discomfort for the patient.

**FEEDING THE PATIENT IMMEDIATELY AFTER THE OPERATION**

Since a patient usually cannot tolerate solid food immediately after an operation, it is withheld anywhere from a few hours to two or three days. A feeding that is too early may nauseate the patient and cause vomiting and possible aspiration. This results in further fluid and electrolyte losses, discomfort, and potential pneumonia. The following outline lists the various types of dietary support that can be used during this short part of the postoperative period.

1. No food by mouth (NPO)
2. Intravenous feeding: blood transfusion, fluids and electrolytes, 5% dextrose, vitamin and mineral supplements, protein-sparing solutions (with or without Intralipid), combinations of above
3. Oral feeding: routine hospital progressive liquid diets with or without supplements, liquid-protein supplements with or without nonprotein calories, combinations of above
4. A combination of oral and intravenous feedings

Many clinicians feel that it is not worthwhile to provide aggressive nutritional support during such a short period of food deprivation. This decision is justified in a well-nourished individual who can afford temporary catabolic losses and would not be able to efficiently use the supplied protein or calories. As described in Activity 1, the majority of patients do not fit this category. The attending physician must decide if the patient is well nourished and if enteral or parenteral feedings can be tolerated. If the feedings can be tolerated, a subsequent decision must be made on benefits of these exogenous nutrients. The health professional may, after his or her assessment of the patient’s status, request the physician to evaluate the patient and prescribe additional feedings.

Blood transfusions and fluid and electrolyte compensation are administered to those patients needing them. Some doctors prescribe 5% dextrose solution in saline or water, but the amount given is limited by the patient’s tolerance. Another problem is that a concentrated dextrose solution may cause thrombosis in the peripheral veins. Because of the relatively low nutrient density of dextrose solution, it should not be used as a long-term means of feeding. It has been claimed generally that the infusion of dextrose spares some body protein from breakdown to provide needed calories. Recently various medical centers have experimented with the infusion of protein-sparing solutions made up mainly of essential amino acids. The preliminary trials have been very encouraging. However, if such means are used every day, it may not only be expensive, but further deteriorate fragile peripheral veins. Some hospitals use vitamin and mineral supplements as well as protein-sparing solutions.

Although solid foods are withheld from patients immediately after an operation, most hospitals provide patients with oral feedings after their intestinal functions return to normal (as early as 24 hours after the operation). The feedings consist of routine hospital progressive diets (see Chapter 14). This stepwise postoperative feeding may cover one to three days, depending on the patient’s tolerance, strength, and type of operation or trauma.

Some patients may be able to start with a soft diet, while others must begin with a clear liquid diet. Progressive feedings occasionally may be supplemented with commercial formulas. Some patients are given liquid-protein supplements with or without nonprotein calories if they can tolerate the feedings. Again, depending on the patient and his or her condition, a combination of feeding methods, including total parenteral nutrition (see Chapter 14), may be used. For patients requiring tube feeding, consult the detailed procedures described in Chapter 14.

At this early stage of postoperative recovery, physicians, nurses, and dietitians should work closely to determine whether dextrose solution or oral liquid diets should be continued. This is important, since both types of feeding may not be nutritionally sound without concentrated supplements. Nutritional supports, including fluids, electrolytes, protein, calories, and other nutrients, should be carefully reviewed. Finally, a long-term aggressive postoperative dietary treatment should be planned and executed to combat the catabolic consequences of trauma and to bring about a speedy recovery.

**DIETARY MANAGEMENT FOR RECOVERY**

When a patient can tolerate regular hospital foods, the health team should plan and prescribe an appropriate diet. Experts in clinical nutrition have tried for a number of years to develop a postoperative diet that will provide patients with an optimal amount of nutrients. In general, the following diet prescription should satisfy most clinical conditions that involve trauma:

1. 40–50 kcal/kg body weight/d
2. 12%–15% of total calories as protein
3. Well-balanced intakes of the established RDAs/DRIs
4. Carefully monitored intakes of vitamins A, K, C, B₁₂; folic acid; and the minerals, iron and zinc

To illustrate the protein and calorie composition of such a diet, Table 15-2 includes two examples (40 kcal and 50 kcal/d) for a man weighing 70 kg.

**CHAPTER 15 DIET THERAPY FOR SURGICAL CONDITIONS**

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If the patient has a minimal amount of tissue and blood loss, a sound preoperative nutritional status, a moderate to good appetite, and no sign of surgical complications, a diet of 35 to 40 kcal/kg is probably sufficient. However, the diet for a postoperative patient should be individualized, especially the serving sizes and the frequency of feeding. Patients usually tolerate solids better if the feedings are small and frequent.

Both carbohydrates and fats are important sources of calories, and they should be provided in about equal quantities to constitute 85%–88% of the total calories. If this reduces the patient’s appetite, less fat should be consumed. The calories from carbohydrates and fats used to correct hypermetabolism supply energy for all processes of rebuilding and repairing, and spare protein for anabolic purposes.

If the patient is given solid food, a good quantity of fruits and vegetables should be included in meals in addition to protein, fat, and carbohydrate. Refer to Chapter 14 for planning a high-protein, high-calorie, balanced diet. The need for vitamins A, K, C, B₁₂, and folic acid in a postoperative regimen requires special attention. Vitamins A and C have been proven experimentally and clinically to assist in wound healing as well as tissue repair. Patients usually tolerate solids better if the feedings are small and frequent.

Both vitamins A and C have been proven experimentally and clinically to assist in wound healing and repair. Vitamin A is well known for its role in maintaining epithelial structures, and vitamin C is important for collagen synthesis. In addition, vitamin A acid (retinoic acid) has recently been shown to assist in wound healing and repair. Vitamin A has a definitive role in wound healing and clinical supplementation with zinc postoperatively is now common. Zinc sulphate is the preferred form, given in dosage amounts of 18–22.5 mg/day. (See Table 15-1 for food sources of these essential nutrients.)

There are differences with the dietary care of patients undergoing different types of surgery, such as digestive tract, gynecological organs, or pancreas. Space limitation does not permit discussions of details for each surgical condition. However, the next section presents a discussion of important considerations in the nutritional and dietary care of a patient with part of the intestine surgically removed.

**TABLE 15-2** Approximate Protein and Calorie Content of a Postoperative Diet for a Male Patient Weighing 70 kg

<table>
<thead>
<tr>
<th>kcal/kg Body Weight</th>
<th>Total Daily Kilocalories</th>
<th>Approximate Dietary Protein (g)</th>
<th>Total Calories from Protein (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>2800</td>
<td>84</td>
<td>12</td>
</tr>
<tr>
<td>50</td>
<td>3500</td>
<td>131</td>
<td>15</td>
</tr>
</tbody>
</table>

Zinc has a definitive role in wound healing and clinical supplementation with zinc postoperatively is now common. Zinc sulphate is the preferred form, given in dosage amounts of 18–22.5 mg/day. (See Table 15-1 for food sources of these essential nutrients.)

Gastrointestinal Surgery: An Illustration

According to some professionals, early removal of the nasogastric tube, early oral feeding, and a reasonable transition to a regular diet is safe and tolerated in most patients after gastrointestinal (GI) surgery. The patients who may not benefit from or tolerate this more progressive postoperative care are those who have had emergency GI surgery. In terms of the first postoperative meals, the ideal approach may be to allow patients to select their foods and beverages. Those patients who are nauseated or not hungry are more likely to choose clear liquids, and those who are hungry and feeling well will choose from a regular diet.

As an illustration, we will study the dietary care of a patient undergoing partial removal of the GI tract.

The normal small intestine is 300–800 cm (10–25 ft) in length (⅕ jejunum and ⅗ ileum). The normal colon (large intestine) is about 150 cm (10 ft). Most nutrients are absorbed in the jejunum. Nine liters of fluid per day enters the small bowel. Normally, all but 1 liter is absorbed proximal to the colon. The colon absorbs more than 80% of the remaining fluid, and can absorb up to 3–4 liters daily. The colon also has the capability to salvage energy by the fermentation of complex carbohydrate and soluble fiber to short chain fatty acids.

Short-bowel syndrome refers to a surgical loss of significant distal ileum, ileocecal valve, and/or colon. The result is a faster overall transit and the potential for greater loss of fluid and nutrient. Following a resection, the ileum has a greater ability to adapt than the jejunum. The adaptation depends on the size of section of ileum or colon removed or nonfunctional. The function of the remaining bowel may further be handicapped by:

- Mucosal disease
- Bacterial overgrowth
- Rapid gastric emptying
- Excessive gastric acid with inactivation of pancreatic lipase and deconjugation of bile salts, or pancreatic insufficiency
If 100 cm or more of terminal ileum is removed, there is impairment of the absorption of vitamin B₁₂ and bile salts, which means the absorption of fat and fat soluble vitamins will also be affected. If there is less than 100 cm of remaining jejunum or ileum (without a colon or ileocecal valve) or less than 50 cm of small bowel attached to the colon, central parenteral nutrition may be required until clinical conditions indicate otherwise.

The process of intestinal adaptation is facilitated by complex foods and continues for one or more years in adults. Stool output with diarrhea may depend on the type of carbohydrate consumed, simple or complex. Excessive eating is an important adaptive response to malabsorption.

Thus, approaches to diet therapy for a patient with short-bowel syndrome are as follows:

During the initial postoperative period, recommended management includes no food by mouth, with intravenous feeding of electrolytes and central parenteral feeding if indicated. Increase oral intake gradually, which will be determined by patient response and clinical status, starting with 6 small feedings per day, avoiding hyperosmolar liquids.

Advance to regular diet, mostly unrestricted with high calories and protein intake. In most patients, lactose is well tolerated except those with a significant amount of jejunum removed.

Some patients require supplements of vitamins and some trace elements and minerals. Some patients require supplemental calcium, magnesium, and zinc. If the distal ileum is removed, the patient may need Vitamin B₁₂ injection via vein or musculature.

The attending physician will prescribe a constant monitoring of blood chemistry especially levels of vitamins and minerals, organ integrity, bone density, and urinary analysis for components and volumes.

If patient has no ileum or colon, dehydration is the greatest concern. Sipping an oral rehydration solution containing a calculated amount of sodium can reduce the need for intravenous fluid. There are several acceptable commercial preparations, though it is important to consider palatability and patient rejection.

If a patient's colon is intact and functioning, encourage the consumption of soluble fiber which is fermented to short-chain fatty acids in the large intestine. Supplemental medium chain triglycerides can increase total calories when absorbed in the small bowel and the colon. Restrict the following:

- Oxalate because it can bind calcium especially in a supplement
- Sugars to avoid diarrhea
- Fat if steatorrhea is present and more than 100 cm of distal ileum is removed

Consider the use of enteral feeding. Several acceptable commercial preparations are available.

**NURSING IMPLICATIONS**

Recognizing that inadequate nutritional support may increase morbidity and mortality during the early postoperative period, the nurse should do the following:

1. Recognize that malnutrition even in the short period of 1–3 days postoperatively may retard the healing process.
2. Monitor the patient closely and provide nourishment as soon as bowel sounds are present.
3. Check for other feeding methods that will furnish adequate nutrients, if oral feedings are contraindicated.
4. Assess total fluid intake carefully and compare total fluid losses to avoid circulating overload.
5. Be aware that any weight gain during this period may be indicative of excess fluids.
6. Recognize the need for extra nutrients and fluids if the patient has elevated temperature.
7. Request specific written orders for change of diet and/or feeding method as the condition indicates.
8. Provide aggressive nutritional support during the early postoperative period as well as in subsequent convalescence.
9. Refer to the nutritional support team for assistance if the facility has one. Otherwise, work within the health team of which you are part.
10. Document all changes, requests, and rationales carefully.

**Progress Check on Activity 2**

1. State the main goal of dietary management in the postoperative period.

2. List three ways this goal can be achieved.
   a. 
   b. 
   c. 

3. Describe the three major functions of plasma protein.
   a. 
   b. 
   c. 

4. Identify five intravenous feedings that may be used in the immediate postoperative period.
   a. 
   b. 
   c. 
   d. 
   e. 

5. Describe the normal progression of routine hospital diets and approximate time periods of use for each (consult Chapter 12 if in doubt about the time periods).

Situation

Johnny B, 5'6"., 150 lb, wrecked his motorcycle. He was wearing a helmet, but sustained a mild concussion. In addition, he received a compound fracture of the left femur and multiple lacerations of the arms, face, and upper body. He was in surgery for three hours. The diet prescription is for a soft diet in six feedings with the following specifications: 45 kcal/kg body weight/day, 15% of total calories as protein, 55% as carbohydrate, and the remainder as fat. Answer the following questions about this situation.

6. What is the total kcal content of Johnny's diet? Round to nearest whole number.

7. How many grams of protein per day will he receive?

8. How many grams of fat are in his diet order?

9. How many grams of carbohydrate will Johnny get?

10. Write a 1-day menu, including the three snacks, that will satisfy the diet requirements.

   Breakfast

   Mid-AM

   Lunch

   Mid-PM

   Dinner

   H.S. (Hour of Sleep)

REFERENCES


Luis, D. A. (2007). Clinical and biochemical outcomes after a randomized trial with a high dose of enteral...


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Diet Therapy for Cardiovascular Disorders

Time for completion
Activities: 1½ hours
Optional examination: ½ hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:

1. Discuss the recommendations regarding the role of diet in preventing heart disease.
2. Describe and state the rationale of diet therapies used for the different heart disorders.
3. List the foods allowed, limited, and forbidden on selected therapeutic diets for heart disorders.
4. Identify resources available for patient education.
5. Identify nursing implications involved in the use of modified diets in cardiovascular disease.

GLOSSARY

Atherosclerosis: thickening of the inside walls of arteries by deposits of fat or cholesterol substances (plaques).
Cardiovascular: of or relating to the heart and blood vessels.
Cerebrovascular accident (CVA): when the blood vessels in the cerebrum (brain) are deprived of oxygen by an obstruction (occluded). This may be due to plaque formation, thrombus (blood clot), or aneurism (rupture of...
Triglycerides: the principal form of fat in foods and in the body fat. It is widely distributed in the body tissues and serves many important functions.

Coronary: encircling (like a crown).

Coronary arteries: two large arteries that branch from the ascending aorta and supply the heart muscle with blood.

Coronary heart disease (CHD): the coronary arteries supply all of the blood to the heart muscle. Occlusion, most often caused by narrowing of the vessels by plaque (atherosclerosis), deprives it of its nutrients and causes death to the part of the heart muscle that is occluded. When the occlusion is complete, myocardial infarction results (see coronary occlusion).

Coronary occlusion: closing off of a coronary artery-most often caused by the plaques of atherosclerosis. When the occlusion is complete, myocardial infarction (MI) results.

Hyperlipoproteinemia: the presence of abnormally high levels of lipoproteins in the serum.

Hypertension: blood pressure elevated above the normal range for age and sex.

Lipoproteins: the form in which lipids are transported in the blood. There are four main classes of lipoproteins: chylomicrons, very-low-density lipoproteins, low-density lipoproteins, and high-density lipoproteins.

a. Low-density lipoproteins (LDLs) transport 60%–75% of the serum cholesterol. They carry from the liver to the body cells (including blood vessels). High serum levels of LDLs, therefore, increase the risk of CHD (see above).

b. High-density lipoproteins (HDLs) transport 20%–25% of plasma cholesterol. They are believed to collect excess cholesterol from body cells and carry it back to the liver to be excreted or used for making bile.

Myocardial infarction (MI): death of tissue of an area of the heart muscle as a result of oxygen deprivation, which in turn was caused by an obstruction of the blood supply (see coronary heart disease). Commonly referred to as a “heart attack.”

Triglycerides: the principal form of fat in foods and in the body, consisting of three fatty acids and glycerol.

**Background Information**

More than half the people who die in this country each year die of heart and blood vessel disease. About 75% of all adult hospitalized patients show symptoms of heart problems even though they are admitted for other causes. The high occurrence of these health problems means that the nurse should have accurate information about available dietary treatments for heart problems and the rationale for their use.

There is no known single cause of heart disease. However, the presence of a combination of certain factors predisposes a person to high risk of the disease. Some personal characteristics, such as a family history of heart disease, sex, and age cannot be changed, but dietary factors and stressful lifestyles can be modified. Therefore, the diets discussed in this chapter serve two goals: to reduce or prevent further damage to the cardiovascular system, and to prevent development of the disorder in yet unaffected individuals.

**Current Consensus**

The National Cholesterol Education Program (NCEP) is one of three principal programs administered by the Office of Prevention, Education, and Control of the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH). It came about after years of trials and scientific evidence that linked blood cholesterol levels to coronary heart disease. These trials showed that levels could be lowered safely by both diet and drugs (see Table 16-1).

The First Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults was produced in 1988. An additional report was published in 1991 that presented recommendations for high blood cholesterol in children and adolescents. The Second Report by the Expert Panel, in 1993, included evidence that had emerged since 1991 and updated recommendations for the management of high blood cholesterol in adults. This edition includes assessments for cholesterol lowering in women, the elderly, and young adults as well as physical activity and weight loss as components of diet therapy.

<table>
<thead>
<tr>
<th>TABLE 16-1 Criteria for Treatment Intervention in Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classification based on total cholesterol</strong></td>
</tr>
<tr>
<td>&lt; 200 mg/dl—desirable level</td>
</tr>
<tr>
<td>200–239 mg/dl—borderline high blood cholesterol</td>
</tr>
<tr>
<td>≥ 240 mg/dl—high blood cholesterol</td>
</tr>
<tr>
<td><strong>Classification based on LDL cholesterol</strong></td>
</tr>
<tr>
<td>&lt; 130 mg/dl—desirable LDL cholesterol</td>
</tr>
<tr>
<td>130–159 mg/dl—borderline high risk</td>
</tr>
<tr>
<td>≥ 160 mg/dl—high risk</td>
</tr>
</tbody>
</table>

The third report (ATP 3), May 2001, updates clinical guidelines for cholesterol testing and management. It reports and expands indications for intensive cholesterol-lowering therapy in clinical practice. Many persons have high risk for CHD and will benefit from more intensive treatment than was recommended in ATP 1 and 2.

ATP 3 continues to use LDL cholesterol as the primary target of cholesterol-lowering therapy; therefore, the primary goals are stated in terms of LDL. There have been some modifications in lipid and lipoprotein classifications. Compare Tables 16-1 and 16-2. This report is available at the Web site, www.nih.gov. ATP 4, the fourth report, is in the planning and preparation stage.

The reports outline “heart-healthy” eating for the general population, as well as treatment for persons with high cholesterol levels, or those at high risk for developing CHD.

Guidelines have been established for health professionals, patients, and the public. Among these important guidelines are two of particular interest to students of nutrition:

1. To increase the knowledge of health professionals regarding the major role that diet plays in reducing blood cholesterol.
2. To improve the knowledge, skills, and attitudes of students in the health professions regarding high blood cholesterol and its management.

See Table 16-2.

You are encouraged to add these publications to your database for clinical practice, as the reports present guidelines that are the responsibility of not only physicians but also nurses, dietitians, pharmacists, and all other members of the health team. The patient is, of necessity, the center of this team and must be educated to make the dietary and lifestyle changes necessary to reduce CHD risk.

Implementing dietary guidance with the use of nutrition labeling and standards of identity is one example of steps being taken to help Americans implement the guidelines. (Refer to Table 16-3.) The major objective for this sweeping revision is to increase the availability of health-promoting foods.

**Nutritional Risk Factors in Heart Disease**

The risk factors of heart disease include the following:

1. Elevated serum cholesterol
2. Elevated serum triglycerides
3. Obesity
4. Hypertension
5. Generally poor eating habits and a sedentary lifestyle

All of these factors can be altered by diet and exercise.

**ACTIVITY 1:**

**The Lipid Disorders**

**DEFINITIONS**

The term used most frequently in describing the lipid disorders is *hyperlipoproteinemia* (hyer = excess, lipoprotein = fat and protein, emia = in blood, which translates as excess level of fat/protein complex in blood). It refers to higher than normal levels of certain lipids in the blood.

Cholesterol and triglycerides are water-insoluble lipids, carried in the blood by lipoproteins. Diet, genetics, and acquired factors affect the circulating levels of one or more lipoproteins.

Lipoproteins are lipids combined with proteins. They are called apolipoproteins. Three main classes of lipoproteins are very-low-density lipoproteins (VLDL), low-density lipoproteins (LDL), and high-density lipoproteins (HDL). LDL and HDL mainly transport cholesterol, and VLDL transports triglycerides.

The liver makes cholesterol from saturated fat. The amount of cholesterol synthesized is directly related to the quantity of saturated fat consumed. LDLs carry cholesterol to the artery plaques. Plaque formation is directly related to the amount of LDLs present. The connection is cholesterol, LDLs, plaques, and coronary heart disease. HDLs carry cholesterol away from the plaques to the liver, to the gallbladder, and into the intestines, where it is excreted. HDLs, therefore, lower the risk of CHD. It appears that a person with a high HDL level is less likely to develop the disease than a person with a low HDL level. On the other hand, the reverse

<table>
<thead>
<tr>
<th>TABLE 16-2 ATP III Classification of LDL, Total, and HDL Cholesterol (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LDL Cholesterol</strong></td>
</tr>
<tr>
<td>&lt; 100</td>
</tr>
<tr>
<td>100–129</td>
</tr>
<tr>
<td>130–159</td>
</tr>
<tr>
<td>160–189</td>
</tr>
<tr>
<td>≥ 190</td>
</tr>
<tr>
<td><strong>Total Cholesterol</strong></td>
</tr>
<tr>
<td>&lt; 200</td>
</tr>
<tr>
<td>200–239</td>
</tr>
<tr>
<td>≥ 240</td>
</tr>
<tr>
<td><strong>HDL Cholesterol</strong></td>
</tr>
<tr>
<td>&lt; 40</td>
</tr>
<tr>
<td>≥ 60</td>
</tr>
</tbody>
</table>

applies to blood LDL levels; that is, a high LDL level increases the risk of heart disease.

**CHOLESTEROL AND LIPID DISORDERS**

When we talk about blood cholesterol, we now refer to three forms: total, LDL, and HDL. Some health-screening procedures measure the LDL cholesterol since it reflects the actual risk of atherosclerosis. To calculate LDL cholesterol, one may use the following formula (quantities are in mg/dl):

\[
\text{LDL cholesterol} = \text{total cholesterol} - \text{HDL cholesterol} - \frac{\text{triglycerides}}{5}
\]

Normally, the plasma levels of different forms of lipid exist within certain limits. However, particular individuals may deviate from such norms and develop

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Free</th>
<th>Low</th>
<th>Reduced/Less/Fewer</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total calories</td>
<td>Less than 5 calories/refernece serving</td>
<td>Less than 40 calories/refernece serving</td>
<td>Reduced by at least 25%</td>
<td></td>
</tr>
<tr>
<td>Total fat</td>
<td>Less than 0.5 g/refernece serving</td>
<td>3 g or less/refernece serving</td>
<td>Reduced by at least 25%</td>
<td>“% Fat Free”</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>Less than 0.5 g/refernece serving, levels of trans-fatty acids must be 1% or less of total fat</td>
<td>1 g or less/refernece serving and 15% or less of calories from saturated fatty acids</td>
<td>Reduced by at least 25%</td>
<td>“% Lean,” must meet requirements for “Low Fat”</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Less than 2 mg/refernece serving; saturated fat content must be 2 g or less</td>
<td>20 mg or less/refernece serving; saturated fat content must be 2 g or less per serving</td>
<td>Reduced by at least 25%</td>
<td>Contains 2 g or less saturated fat per refernece serving</td>
</tr>
<tr>
<td>Sodium</td>
<td>Less than 5 mg/refernece serving</td>
<td>140 mg or less/refernece serving</td>
<td>Reduced by at least 25%</td>
<td>“Very Low Sodium,” “Very Low in Sodium”: 35 mg or less/refernece serving</td>
</tr>
</tbody>
</table>

*The new FDA labeling requirements make it possible for patients to determine how many grams of total fat and saturated fat are contributed by a serving of a particular food. In addition, the new nutrition label will indicate in a “Percent Daily Value” column the percent the food contributes to the maximum amount of fat allowed in a 2,000-calorie diet that meets recommendations for less than 30% of calories from fat, and less than 10% of calories from saturated fat (see Module 1). Patients will also be able to use the fat and cholesterol descriptors that are now defined by the FDA.

hyperlipidemia, or an elevated level of serum lipid. Three main types of lipid are involved in this condition: cholesterol (an excess of which is called hypercholesterolemia), triglyceride (hypertriglyceridemia), and certain forms of lipoprotein (hyperlipoproteinemia). Hyperlipoproteinemia is usually associated with hypercholesterolemia or hypertriglyceridemia, or both, although the reverse is not necessarily true. Any of the hyperlipidemias is undesirable because it may potentiate atherosclerosis or cause its associated clinical symptoms.

**DIETARY MANAGEMENT**

To treat a patient with a lipid disorder, the attending physician uses laboratory data and clinical examination to type the patient. The typing uses many data: sex, age, symptoms, blood and laboratory tests, family history, and so forth. After the physician has typed the patient, the dietitian implements the appropriate dietary treatment according to the diagnosis. This is not the proper forum to discuss details for treating individual patients.

The second approach involves the public and is applicable to all individuals. It has one goal: to lower blood cholesterol while maintaining adequate diet. At present, the dietary management of a person with high blood (total or LDL) cholesterol is being promoted by three major groups: the American Heart Association (AHA), the National Cholesterol Education Program (NCEP), and other private health groups. All three groups target the amount and type of fats we eat.

**NCEP RECOMMENDATIONS**

Dietary intervention is the first priority in lowering blood cholesterol. The NCEP has also issued a guide for foods low in saturated fat and cholesterol. (See Tables 16-3 through 16-6.)

The NCEP has other recommendations that are of importance in patient care and public health programs:

1. The use of blood cholesterol as a means of classifying the risk of atherosclerosis for the population: The two classifications are based on plasma total cholesterol or LDL cholesterol (Table 16-1). These classifications can be applied if a person’s blood cholesterol is known through screening or other means.
2. Using the LDL cholesterol recommendations, one can make a careful study of a person’s blood lipid and set goals.

**THIRD EDITION OF NCEP (ATP 3)**

ATP 3 recommends a multifaceted approach to reduce the risk for CHD. This approach is designated therapeutic lifestyle changes or TLC. The major features of TLC are reduction in saturated fat and cholesterol intakes, weight reduction, and physical activity. If the patient cannot achieve LDL of < 100 mg/dl by diet alone, LDL-lowering drugs can be started simultaneously. Table 16-4 lists the nutrient composition of the TLC diet. Notice the increase in the amount of fiber in this diet. Fiber, especially soluble forms, helps to lower cholesterol by removing it via excretion in feces. The TLC diet generally follows the Dietary Guidelines for Americans 2000. One exception is that total fat is allowed to range from 25% to 35% of total calories, provided saturated fats and trans-fatty acids are kept low. A higher intake of total fat, mostly in the form of unsaturated fats, can help to reduce triglycerides and raise HDL cholesterol in persons with metabolic syndrome. Examples of daily food choices that meet the dietary guidelines are found in Table 16-5. Table 16-6 delineates the types of fat, cholesterol, and omega-3 content of meat, fish, and poultry, which is a helpful tool in planning diet therapy.

**TABLE 16-4 Nutrient Composition of the TLC Diet**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Recommended Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturated fat*</td>
<td>Less than 7% of total calories</td>
</tr>
<tr>
<td>Polyunsaturated fat*</td>
<td>Up to 10% of total calories</td>
</tr>
<tr>
<td>Monounsaturated fat</td>
<td>Up to 20% of total calories</td>
</tr>
<tr>
<td>Total fat</td>
<td>25%–35% of total calories</td>
</tr>
<tr>
<td>Carbohydrate†</td>
<td>50%–60% of total calories</td>
</tr>
<tr>
<td>Fiber</td>
<td>20%–30 g/day</td>
</tr>
<tr>
<td>Protein (approximately)</td>
<td>15% of total calories</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Less than 200 mg/day</td>
</tr>
<tr>
<td>Total calories (energy)‡</td>
<td>Balance energy intake and expenditure to maintain desirable body weight/prevent weight gain</td>
</tr>
</tbody>
</table>

*Trans-fatty acids are another LDL-raising fat that should be kept at a low intake.
†Carbohydrate should be derived predominantly from foods rich in complex carbohydrates including grains, especially whole grains, fruits, and vegetables.
‡Daily energy expenditure should include at least moderate physical activity (contributing approximately 200 kcal per day).
The risk factors can be reduced by weight reduction and physical activity. The risk factors of the metabolic syndrome correlate to enhanced risk for CHD at any given LDL level. Abdominal obesity is more highly correlated than is an elevated body mass index (BMI).

**SPECIAL CONSIDERATIONS FOR DIFFERENT POPULATION GROUPS**

Men, aged 35 to 65 years have a higher risk of CHD than do women. Middle-aged men in particular have a high prevalence of risk factors, and are predisposed to abdominal obesity and the metabolic syndrome. A large fraction of all CHD occurs in men of middle age. For those who carry relatively high risks, intensive LDL-lowering therapy is needed.

For women, aged 45 to 75 years, onset of CHD is generally delayed by 10–15 years compared with that of men; most CHD in women occurs after age 65. CHD in women younger than 65 occurs in those with multiple risk factors and the metabolic syndrome. Previous belief that the protective effect of estrogen in women accounted for the gender difference in risk for CHD has been cast in doubt in clinical trials of the use of hormone

---

**TABLE 16-5 Examples of Daily Food Choices That Meet the Dietary Guidelines**

<table>
<thead>
<tr>
<th>Food Group</th>
<th>No. of Servings</th>
<th>Serving Size</th>
<th>Some Suggested Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>3–5</td>
<td>1 c leafy/raw</td>
<td>Leafy greens, lettuce</td>
</tr>
<tr>
<td></td>
<td></td>
<td>½ c other</td>
<td>Corn, peas, green beans, broccoli, carrots, cabbage, celery, tomato, spinach, squash, bok choy, mushrooms, eggplant, collard and mustard greens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⅛ c juice</td>
<td>Tomato juice, vegetable juice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 piece fruit</td>
<td>Orange, apple, applesauce, pear, banana, grapes, grapefruit, tangerine, plum, peach, strawberries and other berries, melons, kiwi, papaya, mango, lychee</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⅛ c diced fruit</td>
<td>Orange juice, apple juice, grapefruit juice, grape juice, prune juice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⅛ c fruit juice</td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td>2–4</td>
<td>1 slice</td>
<td>Wheat, rye or enriched breads/rolls, corn and flour tortillas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>½ bun, bagel, muffin</td>
<td>English muffin, bagel, muffin, cornbread</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 oz dry cereal</td>
<td>Wheat, corn, oat, rice, bran cereal, or mixed-grain cereal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>½ c cooked cereal</td>
<td>Oatmeal, cream of wheat, grits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⅛ c dry beans or peas</td>
<td>Kidney beans, lentils, split peas, black-eyed peas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⅛ c potatoes</td>
<td>Potato, sweet potato</td>
</tr>
<tr>
<td></td>
<td></td>
<td>½ c rice, noodles, barley, or other grains</td>
<td>Pasta, rice, macaroni, barley, tabbouli</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⅛ c bean curd</td>
<td>Tofu</td>
</tr>
<tr>
<td>Breads, cereals, pasta, grains, dry beans, peas, potatoes, and rice</td>
<td>6–11</td>
<td>1 slice</td>
<td>Low/nonfat yogurt, skim milk, 1% milk, buttermilk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>½ bun, bagel, muffin</td>
<td>Low-fat cheeses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 oz dry cereal</td>
<td>Lean and extra-lean cuts of meat, fish, and skinless poultry, such as sirloin, round steak, skinless chicken, haddock, cod</td>
</tr>
<tr>
<td>Skim/low-fat dairy products</td>
<td>2–3</td>
<td>1 c skim, 1% milk</td>
<td>Soft or liquid margarine, vegetable oils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 oz low-fat, fat-free cheese</td>
<td>Walnuts, peanuts, almonds, pecans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⩽6 oz/day—Step I Diet</td>
<td>Used in preparation of baked products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⩽5 oz/day—Step II Diet</td>
<td>Cookies, fortune cookies, pudding, bread pudding, rice pudding, angel food cake, frozen yogurt, candy, punch, carbonated beverages</td>
</tr>
<tr>
<td>Lean meat, poultry, and fish</td>
<td></td>
<td></td>
<td>Low-fat crackers and popcorn, pretzels, fat-free chips, rice cakes</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>⩽6–8*</td>
<td>1 tbsp soft margarine</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 oz nuts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>⩽4 yolks/week—Step I Diet</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>⩽2 yolks/week—Step II Diet</td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td></td>
<td>In moderation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Includes fats and oil used in food preparation, also salad dressings and nuts.
TABLE 16-6  Saturated Fat, Total Fat, Cholesterol, and Omega-3 Content of Meat, Fish, and Poultry in 3-Ounce Portions Cooked Without Added Fat

<table>
<thead>
<tr>
<th>Source</th>
<th>Saturated Fat g/3 oz</th>
<th>Total Fat g/3 oz</th>
<th>Cholesterol mg/3 oz</th>
<th>Omega-3 g/3 oz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean Red Meats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef (rump roast, shank, bottom round, sirloin)</td>
<td>1.4</td>
<td>4.2</td>
<td>71</td>
<td>—</td>
</tr>
<tr>
<td>Lamb (shank roast, sirloin roast, shoulder roast, loin chops, sirloin chops, center leg chop)</td>
<td>2.8</td>
<td>7.8</td>
<td>78</td>
<td>—</td>
</tr>
<tr>
<td>Pork (sirloin cutlet, loin roast, sirloin roast, center roast, butterfly chops, loin chops)</td>
<td>3.0</td>
<td>8.6</td>
<td>71</td>
<td>—</td>
</tr>
<tr>
<td>Veal (blade roast, sirloin chops, shoulder roast, loin chops, rump roast, shank)</td>
<td>2.0</td>
<td>4.9</td>
<td>93</td>
<td>—</td>
</tr>
<tr>
<td>Organ Meats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td>1.6</td>
<td>4.2</td>
<td>331</td>
<td>—</td>
</tr>
<tr>
<td>Calf</td>
<td>2.2</td>
<td>5.9</td>
<td>477</td>
<td>—</td>
</tr>
<tr>
<td>Chicken</td>
<td>1.6</td>
<td>4.6</td>
<td>537</td>
<td>—</td>
</tr>
<tr>
<td>Sweetbread</td>
<td>7.3</td>
<td>21.3</td>
<td>250</td>
<td>—</td>
</tr>
<tr>
<td>Kidney</td>
<td>0.9</td>
<td>2.9</td>
<td>329</td>
<td>—</td>
</tr>
<tr>
<td>Brains</td>
<td>2.5</td>
<td>10.7</td>
<td>1,747</td>
<td>—</td>
</tr>
<tr>
<td>Heart</td>
<td>1.4</td>
<td>4.8</td>
<td>164</td>
<td>—</td>
</tr>
<tr>
<td>Poultry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken (without skin)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light (roasted)</td>
<td>1.1</td>
<td>3.8</td>
<td>72</td>
<td>—</td>
</tr>
<tr>
<td>Dark (roasted)</td>
<td>2.3</td>
<td>8.3</td>
<td>71</td>
<td>—</td>
</tr>
<tr>
<td>Turkey (without skin)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light (roasted)</td>
<td>0.9</td>
<td>2.7</td>
<td>59</td>
<td>—</td>
</tr>
<tr>
<td>Dark (roasted)</td>
<td>2.0</td>
<td>6.1</td>
<td>72</td>
<td>—</td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haddock</td>
<td>0.1</td>
<td>0.8</td>
<td>63</td>
<td>0.22</td>
</tr>
<tr>
<td>Flounder</td>
<td>0.3</td>
<td>1.3</td>
<td>58</td>
<td>0.47</td>
</tr>
<tr>
<td>Salmon</td>
<td>1.7</td>
<td>7.0</td>
<td>54</td>
<td>1.88</td>
</tr>
<tr>
<td>Tuna, light, canned in water</td>
<td>0.2</td>
<td>0.7</td>
<td>25</td>
<td>0.24</td>
</tr>
<tr>
<td>Shellfish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crustaceans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lobster</td>
<td>0.1</td>
<td>0.5</td>
<td>61</td>
<td>0.07</td>
</tr>
<tr>
<td>Crab meat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaskan King Crab</td>
<td>0.1</td>
<td>1.3</td>
<td>45</td>
<td>0.38</td>
</tr>
<tr>
<td>Blue Crab</td>
<td>0.2</td>
<td>1.5</td>
<td>85</td>
<td>0.45</td>
</tr>
<tr>
<td>Shrimp</td>
<td>0.2</td>
<td>0.9</td>
<td>166</td>
<td>0.28</td>
</tr>
<tr>
<td>Mollusks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abalone</td>
<td>0.3</td>
<td>1.3</td>
<td>144</td>
<td>0.15</td>
</tr>
<tr>
<td>Clams</td>
<td>0.2</td>
<td>1.7</td>
<td>57</td>
<td>0.33</td>
</tr>
<tr>
<td>Mussels</td>
<td>0.7</td>
<td>3.8</td>
<td>48</td>
<td>0.70</td>
</tr>
<tr>
<td>Oysters</td>
<td>1.3</td>
<td>4.2</td>
<td>93</td>
<td>1.06</td>
</tr>
<tr>
<td>Scallops</td>
<td>0.1</td>
<td>1.2</td>
<td>56</td>
<td>0.36</td>
</tr>
<tr>
<td>Squid</td>
<td>0.6</td>
<td>2.4</td>
<td>400</td>
<td>0.84</td>
</tr>
</tbody>
</table>

replacement therapy (HRT) to reduce risk of CHD in postmenopausal women. Cholesterol-lowering drug therapy is preferred to HRT.

With older adults (men > 65 years and women > 75 years), most new CHD events and coronary deaths occur in this age group. A high level of LDL cholesterol and a low level of HDL still are predictive of the development of CHD in older persons, but TLC is the primary therapy for older people, followed by drug therapy if they are at higher risk because of multiple risk factors or advanced atherosclerosis.

Young adults (men 20 to 35 years, women 20 to 45 years): CHD is rare in this group except in those with severe risk factors such as family history, diabetes, heavy smoking, and so on. Life-habit changes and early detection and intervention of elevated LDL cholesterol can delay or prevent onset of CHD later in life.

RACIAL AND ETHNIC GROUPS

African-Americans have the highest overall CHD mortality rate of any ethnic group in the United States, particularly at younger ages. It is accounted for by the high prevalence of coronary risk factors. Hypertension, diabetes mellitus, cigarette smoking, obesity, physical inactivity, and multiple CHD risk factors occur more frequently in this population than in white populations.

Other ethnic groups and minority populations in the United States vary somewhat in baseline CHD risk, but the evidence is not sufficient to modify general recommendations for cholesterol management in these populations.

Sample menus based on the TLC diet for men and women aged 25 to 49 years, as well as sample menus for several ethnic and regional groups, are found in Appendix B.

THE ROLE OF FISH OILS

In population and clinical studies omega-3 fatty acids, eicosapentaenonic acid (EPA), and docosahexaenonic acid (DHA) found in fatty fish such as albacore tuna, herring, lake trout, mackerel, salmon, and sardines, have been shown to reduce sudden cardiac death, reduce serum triglyceride levels, and retard the accumulation of plaques in blood vessels. Omega-3 fatty acids can also reduce metabolic processes that increase the risk of heart diseases. The matter of safety must consider:

1. Intake of more than 3 grams/day of omega-3 fatty acid from capsules can cause bleeding in some patients, so this should be done only on a physician’s advice.

2. Mercury contamination of fish is an established risk. Federal agencies have issued guides about eating fish with a potential presence of mercury. Chapter 9 discusses a detailed list of mercury content of commercial fish and shellfish and should be consulted for details.

Also, alpha linolenic acid (ALA) found in tofu, soybeans, canola oil, walnuts, flaxseeds, and their oils, can convert into omega-3 fatty acids in the body.

The American Heart Association provides the following guide in the consumption of omega-3 fatty acids for reducing cardiovascular risk:

1. For the general population:
   - Eat a variety of fish (fatty fish) at least twice a week.
   - Include oils and food rich in ALA (flaxseed, canola, and soybean oils; flaxseed and walnuts).

2. For patients with cardiovascular diseases: Consume 1 gm/day of EPA + DHA, preferably from fatty fish. Use of capsule supplements must be under a physician’s guide.

3. For patients with high triglyceride levels: 2 to 4 grains of EPA + DHA per day, provided in capsules under a physician’s supervision.

DRUG MANAGEMENT

As we have discussed, dietary management has two approaches: patient specific or the population as a whole.

Initiation of drug therapy depends upon whether it is used for primary prevention (no evidence of CHD) or secondary prevention (evidence of atherosclerotic disease). The physician makes the decision after careful assessment of all factors.

In primary prevention, at least six months of intensive diet therapy and counseling are usually prescribed before considering drug therapy. Even one year of diet therapy may be considered if the patient is not at immediate risk. If, at this time, the LDL cholesterol still remains above the target level, drug therapy may be added to diet therapy.

For those individuals with severely elevated LDL cholesterol at the beginning, diet therapy alone will not be adequate. Drug therapy is started simultaneously.

All nondrug treatments should be tried: diet modification (the TLC diet), weight control, exercise, and smoking cessation, before drugs are initiated. The drugs have many side effects, are expensive, and are usually used for the rest of the patient’s life. For these reasons diet therapy and exercise are the safest and best treatment and should certainly be used as long as possible before drugs are prescribed.

Both prescription and over-the-counter (OTC) drugs are available. The OTC drugs are nicotinic acid or their derivatives.

Table 16-7 lists drugs used at present.

NURSING IMPLICATIONS

Physicians usually refer patients to registered dietitians or other qualified nutritionists for medical nutrition therapy, which is the term for nutritional intervention and guidance provided by a nutritional professional. However,
the nurse has the closest contact with the patient and in many instances may be the primary teacher.

If you are the primary teacher:

1. Work with the health team to implement all treatment goals: careful assessment, diet counseling, monitoring, and follow-up.
2. Provide explicit patient instruction and use good counseling techniques to teach the patient how to follow the prescribed diet. Use an approved, up-to-date diet manual, or other acceptable sources of material.
3. Provide the patient with a list of foods to be used, limited, or omitted from the diet.
4. Provide an explanation of the reasons these foods are controlled.
5. Encourage the use of prompts to help patients remember.
6. Make arrangements for diet consultation with the dietitian or nutritionist to reinforce teaching.
7. Provide the patient with a list of possible side effects, if drug therapy is used.
8. Be able to check the diet tray and recognize any errors in the food served.
9. Lend assistance to the patient in selecting an adequate menu within the limitations of the diet.
10. Remind the patient to check labels when shopping and describe what to look for. Meet with any others who are directly concerned in shopping and food preparation.
11. Discuss appropriate cooking methods.
12. Recommend reliable resources, either persons or materials, when necessary.
13. Encourage the support of family and friends.
15. Utilize case management and collaborative care of pharmacists, dietitians, and all other members of the health team.

<table>
<thead>
<tr>
<th>TABLE 16-7</th>
<th>Drugs Affecting Lipoprotein Metabolism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drug Class, Agents and Daily Doses</strong></td>
<td><strong>Lipid/Lipoprotein Effects</strong></td>
</tr>
<tr>
<td>HMB CoA reductase inhibitors (statins)*</td>
<td>LDL ↓18–55%</td>
</tr>
<tr>
<td>HDL ↑5–15%</td>
<td>Increased liver enzymes</td>
</tr>
<tr>
<td>TG ↓7–30%</td>
<td></td>
</tr>
<tr>
<td>Bile acid Sequestrants†</td>
<td>LDL ↓15–30%</td>
</tr>
<tr>
<td>HDL ↑3–5%</td>
<td>Constipation</td>
</tr>
<tr>
<td>TG No change or increase</td>
<td>Decreased absorption of other drugs</td>
</tr>
<tr>
<td>Nicotinic acid¶</td>
<td>LDL ↓5–25%</td>
</tr>
<tr>
<td>HDL ↑15–35%</td>
<td>Hyperglycemia</td>
</tr>
<tr>
<td>TG ↓20–50%</td>
<td>Hyperuricemia (or gout)</td>
</tr>
<tr>
<td>Fibric acids§</td>
<td>LDL ↓5–20% (may be increased in patients with high TG)</td>
</tr>
<tr>
<td>HDL ↑10–20%</td>
<td>Gallstones</td>
</tr>
<tr>
<td>TG ↓20–50%</td>
<td>Myopathy</td>
</tr>
<tr>
<td>Unexplained non-CHD deaths in WHO study</td>
<td>Hepatotoxicity</td>
</tr>
</tbody>
</table>

*Lovastatin (20–80 mg), pravastatin (20–40 mg), simvastatin (20–80 mg), fluvastatin (20–80 mg), atorvastatin (10–80 mg), cerivastatin (0.4–0.8 mg).
†Cholestyramine (4–16 g), colestipol (5–20 g), colesevelam (2.6–3.8 g).
¶Immediate release (crystalline) nicotinic acid (1.5–3 g), extended release nicotinic acid (Niaspan[R]) (1–2 g), sustained release nicotinic acid (1–2 g).
§Gemfibrozil (600 mg BID), fenofibrate (200 mg), clofibrate (1000 mg BID).
TABLE 16-8 Clinical Identification of the Metabolic Syndrome

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Defining Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal Obesity*</td>
<td>Waist Circumference ≥ 102 cm (&gt; 40 in)</td>
</tr>
<tr>
<td></td>
<td>Women</td>
</tr>
<tr>
<td></td>
<td>&gt; 88 cm (&gt; 35 in)</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>≥ 150 mg/dl</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td>Men</td>
</tr>
<tr>
<td></td>
<td>&lt; 40 mg/dl</td>
</tr>
<tr>
<td></td>
<td>Women</td>
</tr>
<tr>
<td></td>
<td>&lt; 50 mg/dl</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>≥ 130/≥ 85 mmHg</td>
</tr>
<tr>
<td>Fasting glucose</td>
<td>≥ 110 mg/dl</td>
</tr>
</tbody>
</table>

*Overweight and obesity are associated with insulin resistance and metabolic syndrome. However, the presence of abdominal obesity is more highly correlated with the metabolic risk factors than an elevated body mass index (BMI). Therefore, the simple measure of waist circumference is recommended to identify the body weight component of the metabolic syndrome. Some male patients can develop multiple metabolic risk factors when the waist circumference is only marginally increased, e.g., 94–102 cm (37–39 in). Such patients may have a strong genetic contribution to insulin resistance. They should benefit from changes in life habits, similarly to men with categorical increases in waist circumference.


MULTIPLE CHOICE

Circle the letter of the correct answer.

9. Amount of fiber per day recommended in the TLC diet is:
   a. 10–15 g
   b. 15–20 g
   c. 20–30 g
   d. 30–40 g

10. Most deaths from coronary heart disease occur in which of these age groups?
    a. men age 35–45 years, women age 45–65 years
    b. men over age 65 years, women over age 75 years
    c. minority groups of all ages
    d. a and b
    e. a, b, and c

11. Which of the following groups of foods would be most suitable for a patient on a TLC diet?
    a. beef rounds, lamb, coconut, pasta
    b. tofu, chicken, catfish, peanut butter
    c. duck, avocado, shrimp, almonds
    d. liver, bologna, sherbert, olives

LIST

12. List at least eight techniques a nurse should use when teaching a patient about cholesterol-lowering diet therapy.

   a. 
   b. 
   c. 
   d. 
   e. 
   f. 
   g. 
   h. 

6. The most characteristic feature in the identification of metabolic syndrome is _____________

7. Statins are the most commonly prescribed drugs for _____________.

8. Which drug is currently available OTC?
   _____________.
PRACTICE QUESTION
Write a 1-day menu for a 45-year-old Mexican-American woman on the TLC diet. Write your menu first, then check Appendix B and grade yourself on how well you did.

ACTIVITY 2:  
Heart Disease and Sodium Restriction

Dietary sodium restriction is an important part of the medical treatment for hypertension and congestive heart failure. Although hypertension is a symptom, not a disease, it is one leading contributor to heart attack and stroke and is also associated with kidney diseases. For these reasons, controlling hypertension is one way to prevent the development of these conditions. Congestive heart failure occurs when the heart fails to pump out the returning blood fast enough, allowing blood to accumulate in the right side of the heart. This raises venous pressure (pressure in the vein from the accumulation of blood), causing fluid retention (edema) in the heart and its associated parts.

DIET AND HYPERTENSION
Secondary hypertension is caused by some known factor, such as a kidney disorder. The cause of essential or primary hypertension is unknown. Dietary factors that may cause high blood pressure include obesity and excessive use of salt. Some believe that caffeine in coffee and alcoholic beverages can potentiate the condition. New research indicates that calcium deficiency may be a factor in hypertension.

A low-sodium diet is usually supplemented with drug therapy (antihypertensives). Most antihypertensives contain diuretics. While most diuretics remove water and sodium from the body, some also remove potassium. Since the patient frequently is overweight, a low-calorie diet is also prescribed. Weight loss by itself will often reduce blood pressure, especially in males. The diet should be individually prescribed and tailored to the patient's need for sodium and calorie reduction. Since there are different levels of sodium restriction and many levels of calorie restriction, the diet order must be specific to be effective. A diet order that reads “salt poor, low cal” is unacceptable. Sodium is ordered in milligrams or grams, and calories by a specific number designed to help the patient lose weight. An adequate diet under 1200 calories daily is difficult to plan; it results in low patient compliance, especially with long-term usage. A normal level of protein of high biological value is recommended. Fats in the diet are moderately low and the types of fat flexible. Unsaturated fats used within the caloric allowance are more acceptable than saturated fats. Carbohydrates provide up to 50% of the total caloric intake, but concentrated sweets are not recommended. High-potassium foods should be encouraged if drug therapy causes loss of this mineral in the urine. Some physicians prescribe special potassium supplements.

DIET AND CONGESTIVE HEART FAILURE
The treatment for congestive heart failure consists of rest to reduce the demands on the heart; drug therapy to strengthen the heartbeat and slow it down; and diet therapy to reduce edema and decrease the workload on the heart. The dietary regimen is as follows:

1. Reduce edema. A low-sodium diet is used, usually in the moderate to low range. It is difficult to severely reduce the sodium intake of a patient because such a diet is most unpalatable.
2. Decrease workload. The diet may be of soft consistency and divided into five or six small meals per day. If the patient is overweight, the diet may also be restricted in calories. Fluids are not usually restricted, but excess fluid intake is not allowed. Although individual need varies, 2000 to 3000 ml of fluid per day is acceptable.

Some patients with hypertension and/or congestive heart failure may also require a modification of fat or cholesterol intake.

When a patient with this clinical disorder loses 6% or more of body weight (fat and muscle, not water) in half a year, the condition is known as cardiac cachexia (CC).

CC signals poor prognosis with increased mortality. When this patient undergoes nutritional therapy before an operation, he or she may have a better survival rate after an operation. Therefore identifying the susceptible patient is a priority, meaning that an appropriate nutritional intervention can be implemented before the patient develops CC.

A patient with CC suffers wasting of muscle mass, bone atrophy, lower bone density, and severe loss of fat storage. Some potential candidates and causes for CC may include the following:

1. Senior patients suffering from anorexia, difficulty in chewing and swallowing, nausea from medications, depression, and isolation.
2. Patients undergoing diuretic treatment, where micronutrient and antioxidant deficiencies created by the therapy can also precipitate malnutrition or muscle wasting. Micronutrients involved include selenium, copper, zinc, and magnesium. The diuretic therapy may also precipitate calcium losses. These nutrient deficiencies increase the rate of oxidative stress, one major cause of muscle wasting.
3. Other potential problems that may lead to CC include abnormal clinical conditions such as higher requirement for resting energy expenditure, lower capacity to exercise, and edema.
CC can lead to serious problems for the patient. When diagnosed early it can be treated. Therapy includes but is not limited to nutritional intervention, drug management, scheduled physical activity, use of medical devices, and heart transport.

THE SODIUM-RESTRICTED DIET

The average intake of sodium in the American diet ranges from 3 to 8 grams per day. Although some sodium is essential for body functioning, the amount needed is approximately 1⁄2 to 1 gram daily. The main source of sodium in our diets is table salt (sodium chloride). Salt is about 40% sodium by weight. It is used extensively in food processing for items such as processed meats (lunch meat, ham, bacon, canned meats, and fish), dried foods, sauerkraut, olives, and pickles. It is used in baking and cooking, and then used again at the dining table. In addition, most foods contain some sodium before any processing or cooking takes place. Some unprocessed foods are higher in naturally occurring sodium than others. For example, meats, milk, and eggs are high in natural sodium, whereas most plant foods are low. There are exceptions. Beets, spinach, chard, and kale are fairly high in sodium. Fruits, oils, sugars, and cereal grains contain only a trace of sodium or none at all, if no sodium chloride is added in processing. If a diet is based on the basic food groups, unsalted bread/butter and unprocessed grains and meats are used, and no salt is used during cooking or at the table, then the diet contains approximately 500 mg sodium. It is not difficult to see how we can “overdose” our foods with sodium.

The Diet Guidelines for Americans recommends the use of salt and sodium in moderation (see Chapter 1.) Four levels of sodium restriction are recommended by the American Heart Association to control a patient’s sodium intake. The levels vary from 250 mg up to 3 to 5 grams of sodium daily.

The DASH diet (Dietary Approach to Stop Hypertension) from the NIH is more commonly recommended to prevent or control hypertension than is the AHA diet. The eating plan is rich in various nutrients believed to benefit blood pressure and in other factors involved in maintaining good health. The sodium content is ~2400 mg/day. Access DASH from the following Web site: www.nhlbi.nih.gov/health/public/heart/hbp_low/recap.htm.

Mild Sodium Restriction (3 to 5 Grams Daily)

This is a regular diet that omits only salty foods and the use of salt at the table. Salt may be used lightly in cooking; for example, use half the amount stated in the recipe. This diet is used frequently after discharge from the hospital, when edema is under control. A wide variety of foods from the basic food groups is recommended. Table 16-9 illustrates the foods to avoid within each food group.

<table>
<thead>
<tr>
<th>Meat Group</th>
<th>Fruit and Vegetable Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cured, canned, or smoked meats and fish</td>
<td>1. Any vegetable prepared in brine</td>
</tr>
<tr>
<td>2. Canned dried beans, meat stews, soups</td>
<td>2. Sauerkrut</td>
</tr>
<tr>
<td>3. Meat analogs, e.g., imitation bacon bits</td>
<td>3. Canned tomatoes; tomato juice</td>
</tr>
<tr>
<td>4. Cheeses: regular, processed</td>
<td>4. Tomato sauce or paste</td>
</tr>
<tr>
<td>5. Frozen TV dinners</td>
<td>5. V-8 juice</td>
</tr>
<tr>
<td>6. Ready-prepared meats in gravy or sauces</td>
<td>Other</td>
</tr>
<tr>
<td>7. Kosher meats</td>
<td>1. Salted sauces and seasonings: barbecue sauce, chili sauce, meat sauce, Worcestershire sauce, etc.; any type of salt, including tenderizers and flavor enhancers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grain Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Salty crackers</td>
</tr>
<tr>
<td>2. Rolls with salted tops</td>
</tr>
<tr>
<td>3. Seasoned mixes (e.g., stuffing, pasta, rice)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Milk Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cheese spreads</td>
</tr>
<tr>
<td>2. Processed cheese (cheese spreads)</td>
</tr>
<tr>
<td>3. Cheese: Roquefort, blue, camembert</td>
</tr>
<tr>
<td>4. Salted buttermilk</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fruit and Vegetable Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Any vegetable prepared in brine</td>
</tr>
<tr>
<td>2. Sauerkrut</td>
</tr>
<tr>
<td>3. Canned tomatoes; tomato juice</td>
</tr>
<tr>
<td>4. Tomato sauce or paste</td>
</tr>
<tr>
<td>5. V-8 juice</td>
</tr>
</tbody>
</table>

**TABLE 16-9** Foods Excluded in a 3- to 5-Gram Sodium Diet

**Moderate Sodium Restriction (1000 Milligrams Daily)**

This diet is used both in the hospital and at home. In addition to avoiding the foods indicated for the 3- to 5-gram sodium diet, the diet has the following restrictions:

1. No more than 2 c milk per day.
2. No more than 5 oz meat per day. One egg may be substituted for 1 oz meat.
3. No salt in cooking.
4. Bread and butter beyond three servings daily should be unsalted.
5. No commercial mixes or regular canned vegetables.

**Strict Sodium Restriction (500 Milligrams Daily)**

This diet is used primarily for hospitalized patients, though it may be followed at home. The restrictions, however, result in low patient compliance except in a hospital setting. In addition to the restrictions indicated for 3- to 5-gram and 1000-mg sodium diets, two other restrictions are required to lower the dietary sodium to 500 mg:

1. No bread and butter that has salt added
2. No vegetables that are naturally high in sodium content
Severe Sodium Restriction (250 Milligrams Daily)

The substitution of low-sodium milk for regular milk in the 500-mg sodium diet will lower the dietary sodium content to 250 mg.

The Exchange Lists for Meal Planning, issued by the American Dietetic Association and the American Diabetic Association (see Appendix F), may be modified for the various levels of sodium restriction. This booklet is a helpful tool for diet planning, particularly when a caloric or fat modification is also necessary.

Some drinking water is high in sodium, especially if water softeners are used. Patients on low-sodium diets should ascertain their drinking water's sodium content and, if necessary, use distilled water.

Many drugs, both prescription and over-the-counter, contain high levels of sodium. Patients need to be made aware of these.

NURSING IMPLICATIONS

The nurse should follow the following guidelines.

1. Be aware that sodium-restricted diets are unpalatable, especially at very restricted levels.
2. Be prepared to offer alternative seasonings to enhance flavor and encourage the patient to consume an adequate diet.
3. Caution patients to read the labels on foods and to avoid self-medication. Check medications received in the hospital, and, if they are too high in sodium, ask about alternates.
4. Check trays of all patients on sodium-restricted diets to make sure salt has not been included accidentally.
5. Recognize that patients with congestive heart failure tend to have poor appetites. Accurate intake and output records are necessary. Meal sizes and intervals may need adjusting.
6. Check for inadequate potassium intake when antihypertensives are used.
7. Be aware that iodine intake may be low when salt is restricted.
8. Do not suggest salt substitutes without asking the physician first: there may be impaired renal function or, if a potassium supplement is being used, a patient could develop hyperkalemia. Salt substitutes are high in potassium.

PROGRESS CHECK ON ACTIVITY 2

FILL-IN

2. Write a day's menu for a person on a 500-mg sodium diet with no calorie restriction (use separate sheet).
3. List 10 appropriate seasonings that may be used in place of salt.
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________
   e. __________________________
   f. __________________________
   g. __________________________
   h. __________________________
   i. __________________________
   j. __________________________

Exercise 16-1

Complete Each Column with the Appropriate Information

<table>
<thead>
<tr>
<th>Diet</th>
<th>Disease or Condition</th>
<th>Foods Allowed</th>
<th>Foods Limited</th>
<th>Foods Forbidden</th>
<th>Nursing Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000 mg sodium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000 mg sodium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 mg sodium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250 mg sodium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**ACTIVITY 3: **
**Dietary Care After Heart Attack and Stroke**

**MYOCARDIAL INFARCTION (MI): HEART ATTACK**

Priority is given to life-saving measures immediately following a myocardial infarction (MI). An intravenous line (IV) is prepared and inserted. If needed, the IV can be used to administer drugs and regulate fluid and electrolyte balance.

The goals of diet therapy are to reduce the workload of the heart, restore and maintain electrolyte balance and, after a brief period of undernutrition, to maintain an adequate nutritional intake. The diet therapy progresses as follows:

1. For the first 24 to 48 hours after oral feedings are ordered by the physician, the patient receives only clear liquids.
2. The liquid diet is followed by a low-residue diet, and then a soft diet. Foods are divided into five to six small meals. The diet also may be restricted in sodium, if necessary.
3. Beverages containing caffeine are omitted.
4. The physician may prescribe fluid restriction, if intake and output records warrant.
5. Constipation may accompany a restriction of fiber and/or fluids. Nursing measures to solve this complication are needed.
6. A gradual return to regular foods, with a restriction of sodium, fat, and/or cholesterol for certain patients.

**CEREBROVASCULAR ACCIDENT (CVA): STROKE**

As with a myocardial infarction, the first measures taken by health professionals after a cerebrovascular accident are life saving, not dietary. Ongoing therapy focuses on restoring and maintaining adequate nutrition. Diet therapy after a CVA progresses as follows:

1. An intravenous line is used for the first 24 to 48 hours. Careful monitoring is necessary. Fluids must be restricted if cerebral edema is present.
2. If the patient is comatose, tube feeding will be the diet of choice after IV therapy. Oral liquid feedings may begin when the patient is conscious. If the patient develops paralysis of one side of the throat, he or she will choke more easily on liquids than on semi-solids. In the event of such paralysis, very thick liquids or very soft solids may be necessary.
3. Eventually, with training, the patient may return to a regular diet.
4. Depending on the patient, the diet may be low in calories, sodium, fat, and/or cholesterol.

After the initial emergency measures, the health team will implement many care procedures, and those affecting eating and diet will include the following:

1. An evaluation of the patient is made by a speech therapist and an occupational therapist.
2. The patient’s food and beverage tolerance is observed, applying aspiration when necessary.
3. Initially, the patient is fed thickened liquids with a consistence of a nectar, honey, or pudding when indicated.
4. Commercial preparations such as roll thickeners (Thick It) or other prethickened products may be ordered from the food service department.
5. Standard procedures indicate the texture of the food be modified according to the dysphagia diet used routinely in hospitals. This diet progresses in 4 stages.
   - Stage 1: Diet is pureed.
   - Stage 2: Diet is mechanically changed to a semi-solid and moist consistence that is cohesive with the following characteristics:
     - Presence of some chewing ability
     - Meats that are grounded or minced
     - Fruits and vegetables fork-mashable
     - No dry food such as bakery products (bread, crackers)
   - Stage 3: Diet is advanced to soft solids with the following characteristics:
     - More chewing ability
     - Meats that can be cut easily
     - Fruits and vegetables that are not hard and crunchy
     - Sticky food
     - Foods with little moisture
   - Stage 4: Diet is a regular one with solid textures.

There are other considerations for a patient suffering from a stroke:

1. Visual impairment
2. Low appetite
3. Use of tube feedings
4. Food-drug interactions
5. Lifestyle modification if indicated

The health team is familiar with all the above issues and adjustments. Lifestyle modification is an important public concern. The issues cover exercise, lowering blood pressure, salt intake, and the quantity and quality of fat consumed. Government and private institutions have made recommendations, most of which have been presented in various chapters in this book. Use the index to find the appropriate chapter for more details.
NURSING IMPLICATIONS

The responsibilities of the nurse include the following:

1. Assess food deficits as soon as oral feedings are resumed, and take measures to restore sufficient intake.
2. Allow self-feeding for both MI and CVA patients as soon as possible.
3. Position the patient to allow maximum use of his or her remaining abilities and to give the patient some control.
4. Schedule nursing care and treatment far enough in advance of meals to let the patient rest before eating.
5. Relieve pain before meals are served.
6. Promote comfort, relieve anxiety, and be very patient.
7. Explain all restrictions in the patient’s diet.
8. Teach diet restrictions when the patient is able to listen (when anxiety and fear have diminished).
9. Make arrangements for those involved in food purchasing and preparation to be involved in the teaching session with the dietician.

PROGRESS CHECK ON NURSING IMPLICATIONS

FILL-IN

1. List four objectives of diet therapy for a patient who has had a myocardial infarction.
   a. ____________________________________________
   b. ____________________________________________
   c. ____________________________________________
   d. ____________________________________________

2. List as many nursing measures as you can think of to assist a stroke victim to ingest an adequate diet.
   a. ____________________________________________
   b. ____________________________________________
   c. ____________________________________________
   d. ____________________________________________
   e. ____________________________________________
   f. ____________________________________________
   g. ____________________________________________
   h. ____________________________________________
   i. ____________________________________________
   j. ____________________________________________

3. State five nursing measures applicable to the feeding of a CVA patient with right-sided hemiplegia who is not comatose.
   a. ____________________________________________
   b. ____________________________________________
   c. ____________________________________________
   d. ____________________________________________
   e. ____________________________________________

4. Explain the rationale for a diet therapy that specifies “soft 2 g sodium in 6 feedings” for a 5-day, post-MI patient.
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________

PROGRESS CHECK ON ACTIVITY 3

FILL-IN

1. List five hidden sources of sodium.
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________
   e. __________________________

2. List 10 seasonings that may be used freely on a low-sodium diet.
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________
   e. __________________________
   f. __________________________
   g. __________________________
   h. __________________________
   i. __________________________
   j. __________________________
MULTIPLE CHOICE

Circle the letter of the correct answer.

5. Which of the following menus would be the best choice for a person on a 1-g sodium, low-cholesterol diet?
   a. split pea soup, crackers, tuna salad, ice cream, and tea
   b. scrambled eggs, baked potato, fruit salad, baked apple, and skim milk
   c. broiled fresh trout with lemon, baked potato, sliced tomato salad, skim milk, and peach halves
   d. prime rib roast, broccoli, mashed potatoes, sliced pineapple, and tea

6. From the following list, which foods would be most suitable for a person on a 500-mg sodium diet?
   a. tuna fish salad with lettuce
   b. sliced turkey with cranberry sauce
   c. scalloped potatoes and ham
   d. honey and peanut butter sandwich

REFERENCES


CHAPTER 17

Diet and Disorders of Ingestion, Digestion, and Absorption

Time for completion
Activities: 1–½ hours
Optional examination: ½ hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:

1. List the diet modifications used in certain gastrointestinal disorders.
2. Explain the rationale for the use of diet modifications.
3. Describe the diet modification sequence and progression.
4. List foods that meet the diet requirements.
5. State nursing implications for dietary care.

GLOSSARY

Antiemetics: an agent (drug) that relieves vomiting.
Aspiration: the act of inhaling. Pathological aspiration of vomitus or mucus into the respiratory tract (lungs) may occur when a patient is unconscious or under the effect of anesthesia.
Cachexia: general wasting of the body, especially during chronic disease.
Cholinergic: an agent (drug) that stimulates the action of the sympathetic nerves.
Colostomy: creation of an opening between the colon and surface of the body. A surgical procedure.
Defecate: to eliminate waste and undigested food from the rectum.
Esophageal varices: varicose veins in the esophagus.
Flatus: gas expelled from the rectum.
Gallstones: precipitation of cholesterol crystals in the gallbladder to form stones.
Gastrectomy: removal of part of the stomach.
Helicobacter pylori (H. pylori): common rod-shaped bacteria that live in the gastrointestinal tract around the pyloric valve, lower gastric antrium, and upper duodenal bulb. They are well known for their role in chronic gastritis and, more recently, in the gastric ulcer process.
Hemorrhoidectomy: surgical removal of varicose veins in the mucosa either outside or just inside the rectum.
Ileostomy: creating an opening between the ileum and the surface of the body by establishing a stoma (see Stoma) on the abdominal wall.
Ileum: distal portion of the small intestine extending from jejunum to cecum.
Immunotherapy: passive immunization of an individual with preformed antibodies. It activates the entire immune system to fight off disease. Most recently used in terminology relating to treatment of cancer.
Intraluminal: within the lumen (wall) of a tubular structure.
Jejunum: part of the small intestine extending from the duodenum to the ileum.
Mucosa (mucous membrane): the membrane that lines the tubular organs of the body.
NSAIDs: nonsteroidal anti-inflammatory drugs.
Osteomate: one who has had an ostomy (colostomy or ileostomy). These are surgical procedures for creating an opening to the outside of the body for the elimination of waste.
Pectin: a carbohydrate that forms a gel when mixed with drochloric acid.
Pylorus: a distal part of the stomach opening into the duodenum. Contains many glands that secrete hydrochloric acid.
Stoma: a mouthlike opening. A surgical opening kept open for drainage and other purposes.
Varices: plural for varix; an enlarged, tortuous vein, artery, or lymph vessel.

BACKGROUND INFORMATION

The gastrointestinal (GI) tract extends from the mouth to the anus. All disturbances related to food intake, digestion, absorption, and elimination affect the GI tract and usually require special diets. Such diets were among the very first ever used in the treatment of diseases. Unfortunately, many have not changed much since they were first used, even though recent research has shown that some of the diets used to treat diseases are ineffective and incompatible with the clinical conditions of patients. Two notable examples include the diets for diverticular diseases and peptic ulcer.

Psychological factors play a role when we consider many disorders of the GI tract. The digestive system is said to “mirror the human condition.” If this is true, then specific foods do not cause the problem in all cases; rather, the psychological state of the body that receives them can be responsible. Stress factors such as anxiety, fear, work pressure, grief, emotional makeup, and coping patterns have a great deal to do with how or if foods are tolerated. If a person has specific food allergies or a physiological basis for food intolerance (such as an enzyme deficiency), then the offending foods obviously should not be eaten. Otherwise, as in the case of an ulcer patient, there is no sound basis for the traditional diet therapy that permits only soft, white, or mildly flavored foods.

Frequently, patients who have experienced traditional diet therapy will challenge a prescription of modern diet therapy. Nurses must understand and be prepared to explain the newer concepts of dietary management.

ACTIVITY 1:
Disorders of the Mouth, Esophagus, and Stomach

MOUTH
Cleft Lip and/or Palate
A congenital defect of newborns, cleft lip and/or palate is corrected by a series of surgeries after the infant reaches a weight safe enough to withstand a surgical procedure. These infants have a high nutritional requirement to prepare for surgery and rapid growth. The care provider must practice care in the positioning and feeding of these children to prevent aspiration. Certain types of nipples and/or tubing may be required for infant feeding. Families need counseling in the feeding and care of these infants. Nurses should receive additional training when caring for and teaching others to care for such patients.

Dental Caries
Almost all children in the United States are afflicted with decayed teeth, and about 30% of Americans past the age of 25 wear full dentures. While poor dental hygiene (improper brushing, not flossing, and failing to get check-ups) may account for part of the problem, much is dietary in nature. Lack of essential nutrients such as calcium, phosphorus, fluorine, and vitamins D, A, and C affect
tooth and gum formation and development. Because both deciduous (“baby”) and permanent teeth are formed in utero (before birth), the diet of the mother affects the offspring’s teeth. Fetuses are not parasites and cannot necessarily derive adequate amounts of each nutrient needed for development from the mother. Some children are born without all of their permanent teeth buds, and, in this case, it is prudent to maintain deciduous teeth as long as possible.

A youngster’s diet affects the strength and function of his or her teeth. Milk, juice, or sweetened drinks left in the bottle against an infant’s gums during sleep can cause decay of newly erupted teeth. This is known as the “baby bottle syndrome.” Children learn to like sweets if they receive them early in their diet. It is believed that the high use of concentrated sweets, especially the sticky type, is the main culprit in the formation of cavities (dental caries).

Health promotion measures that will benefit oral tissues throughout life include a well-balanced diet with adequate amounts of essential nutrients, limitation or omission of sweets, and proper oral hygiene and dental care.

Dentures

The wearing of dentures can be a mixed blessing. If properly fitted, they provide the ability to ingest a variety of foods not possible otherwise. Dentures are cosmetically attractive and improve self-esteem, but there are disadvantages associated with them. As bone recedes after teeth have been extracted, frequent realignments are mandatory for proper fit. Loose dentures may collect particles underneath them, causing pain. Rubbing between dentures and the gum tissue creates sore spots that can lead to inflammation or even tumors. The health of the gums on which dentures rest determines the success of wearing dentures. An adequate supply of vitamins A and C, along with other nutrients, is essential to gum tissue integrity.

Many older people have ill-fitting dentures or no dentures at all, even though they may have no teeth. This can cause great difficulty in chewing food, and therefore, in the digestion of food. This leads to a decreased intake of fiber and other essential nutrients, since unchewed and undigested foods are not absorbed. The effect of this condition on health is obvious.

Whenever dental problems exist or dentures are absent, the mechanical soft diet is preferred, since it provides adequate nutrition and ease of chewing. Chapter 12 provides additional information on the mechanical soft diet.

Fractured Jaw

The nutritional needs for a person following the trauma of a fractured jaw are high, as in other types of fractures. The treatment of choice is to wire the jaws together, which poses obvious problems with eating. A diet high in protein, calories, minerals, and vitamins is necessary for proper healing. Liquid food must pass through a straw without moving the jaw. Care must be taken to prevent choking, and a wire cutter must be close at hand to cut the wire if choking occurs. As the person is usually home for a considerable length of time before the wires are removed, the caretaker must be taught how to use the wire cutter. Since the practice of oral hygiene is difficult, the oral tissues must be cleaned by a special and thorough procedure to prevent bacterial growth. Lack of adequate cleaning can cause cavities and produce odors that decrease the appetite. Table 17-1 lists examples of foods suitable for the person with a fractured jaw.

ESOPHAGUS: HIATAL HERNIA

The esophagus is separated from the stomach by the diaphragm. When the stomach partially protrudes above the diaphragm opening because of the weakening of the diaphragm, hiatal hernia results. Hiatal hernia is usually treated with antacids and a low-fat diet. Six small feedings per day are recommended, and fluids are taken between meals. Foods that irritate esophageal mucosa are eliminated—for example, orange, tomato, or grapefruit juices. Alcoholic beverages should be avoided. Patients should not eat within two hours of bedtime. Extra fluids and laxative foods help to prevent constipation that can put pressure on the esophagus. Patients should not lie down or bend over after eating. Extra height in the form of pillows or an elevated bed-head for sleeping is recommended. If the patient is obese, weight loss will improve the clinical condition. Fats are usually avoided, since they tend to lower esophageal pressure and add calories.

STOMACH: PEPTIC ULCER

Dietary Management

Peptic ulcer is the most common of the problems affecting the upper GI tract. An ulcer is an erosion of the stomach, pylorus, or duodenum. Ulcers occur only in areas affected by excess hydrochloric acid and pepsin (an enzyme). The most common location is the duodenal bulb, because the gastric contents emptying through the pyloric valve are most concentrated in acid at this point. The following are the major causative factors of peptic ulcer:

1. Increased acidity and secretion of gastric juices
2. Decreased secretion of mucous lining and buffers
3. Prolonged use of nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin, ibuprofen, and others
4. Helicobacter pylori (H. pylori) infection—Infection by this bacteria, along with hydrochloric (HCl) acid and pepsin secretion, is now believed to be a major cause of ulcers.
TABLE 17-1  Foods for a Patient with a Fractured Jaw

<table>
<thead>
<tr>
<th>Composition of feedings</th>
<th>These are oral feedings composed of approximately</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250 g carbohydrate</td>
</tr>
<tr>
<td></td>
<td>115 g protein</td>
</tr>
<tr>
<td></td>
<td>110 g fat</td>
</tr>
<tr>
<td></td>
<td>2400 calories</td>
</tr>
</tbody>
</table>

| General instructions | 1. Follow the family menu as closely as possible, if the meal pattern is adequate. |
|                     | 2. Plan for the increase in protein by using meats of all kinds (beef, pork, poultry, lamb, veal, fish, organ meats) and meat substitutes such as eggs, cottage cheese, other soft cheeses, and yogurt. |
|                     | 3. All meats should be lean and, with the exception of beef, should be well cooked; beef may be used raw or rare if desired. Use sufficient broth when blending. |
|                     | 4. All meats, vegetables, breads should be cubed before being added to blender. Eggs should be added last when blending. |
|                     | 5. If butter or margarine is used, it should be very soft or melted before adding to mixture. |
|                     | 6. It may be necessary to strain the mixture after it has been blended to prevent clogging. |
|                     | 7. Variety can be obtained by using soups, vegetable juices, or broths for blending instead of milk, but be aware that this lowers total caloric intake. |
|                     | 8. The patient should participate in the selection of the various meats, vegetables, and pastas that go into the blender. |

<table>
<thead>
<tr>
<th>Meal plan for oral liquid feedings</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strained juice</td>
<td>Fruit drink</td>
<td>Fruit eggnog</td>
<td></td>
</tr>
<tr>
<td>Hot blended drink</td>
<td>Hot blended drink</td>
<td>Hot blended drink</td>
<td></td>
</tr>
<tr>
<td>Coffee/cream/sugar if desired</td>
<td>Coffee/cream/sugar if desired</td>
<td>Beverage of choice</td>
<td></td>
</tr>
<tr>
<td>or Beverage of choice</td>
<td>or Beverage of choice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Supplemental Feedings | To increase caloric intake over 2400 add any of these: fruit drink, fruit eggnog, a thick milkshake, liquid gelatin, chocolate milk, malted milk, or regular eggnog. Dry milk powder or vitamin supplements may be added to increase nutrients upon recommendations of the physician. |

Recipes: follow for those items marked

Recipes for oral feedings:

**Hot Blended Drink #1**

- ½ c cooked refined cereal such as farina, grits, cream of wheat, etc.
- 1 c hot milk*
- 2 soft-cooked eggs
- 1 tsp melted butter or margarine
- ½ tsp salt (optional)

Mix all ingredients except fat. Blend to desired consistency and strain. Add the melted fat and salt. Reheat to desired temperature.

**Hot Blended Drink #2**

- ½ c cubed poultry, veal, pork, lamb, or cheese
- ½ c cooked rice or pasta
- ½ c cooked vegetable of choice
- 1–2 slices whole wheat bread, cubed
- 1¼ c milk*
- 1 tsp melted butter or margarine
- ½ tsp salt (optional)

Blend the meat or substitute separately with ½ c of the milk for approximately 2 minutes. Add rice or pasta, vegetable, and bread. Add remaining milk and salt. Blend to desired consistency. Strain the mixture. Add the melted fat and reheat to desired temperature before serving. 

*(continues)*
Treatment goals for the peptic ulcer are to relieve pain, heal erosion, prevent complications, and prevent recurrences. Therapy usually includes rest, antacids, and anticholinergics. Physicians recommend reduction of ulcer-predisposing factors such as stress, hurried or skipped meals, and excess coffee, colas, smoking, and aspirin.

Current drug therapy for ulcers now includes the use of histamine receptor blockers (H2 blockers) such as Tagamet, Zantac, Axid, and Pepsid. Some newer, more potent drugs approved for use help ulcers to heal more rapidly. Antacids are still used as standard therapy, the preferred ones being those with a magnesium or aluminum base, such as Maalox or Mylanta. Calcium-based antacids (e.g., Tums) are thought to stimulate acid secrections and are not generally recommended. Antibiotics, including Flagyl, Achromycin, and Amoxil, are used to counter the H. pylori bacteria. (The drugs mentioned are brand names. Consult the Physician’s Desk Reference for more information.)

These drugs are used in tandem with the general measures of adequate rest, sleep, and stress-reduction measures that have always been standards.

**Principles of Diet Therapy for Peptic Ulcer Disease**

1. A highly restrictive diet is no longer ordered for peptic ulcer. The diet is a regular one that follows dietary guidelines, with enough increases for tissue healing and promotion of optimal nutritional status. The condition of the individual, determined after a complete nutritional assessment, will determine the amount of calories and nutrients needed.

2. Another change that has occurred in the dietary management of peptic ulcer is that of the meal pattern: Patients are advised to eat three meals a day without snacks, especially at bedtime. This change from former meal plans is to avoid the production of excess acid.

3. Meal size should be moderate; large meals cause distraction and pain.

4. There is no need to eliminate a particular food unless it causes repeated discomfort.

5. Dietary fiber, especially soluble dietary fiber, is not restricted. In fact, it is encouraged according to patient tolerance.

6. Individualized tolerances include:
   a. Seasonings: Hot chilies and black pepper are common irritants; other than these, the individual may have any seasonings that do not cause a problem.
   b. Alcohol: High-proof alcohols (80 proof) and beer are potent gastric juice stimulants and should be avoided. Some patients tolerate small amounts of wine when taken with a meal.
   c. Coffee (regular and decaffeinated), tea, and colas are to be avoided as they are gastric stimulants. If small amounts of coffee are used, the coffee should be drunk with or after a meal to minimize its effects.

7. General recommendations:
   a. Avoid aspirin and other NSAIDS. If pain medication is needed, use the acetaminophen types (e.g., Tylenol).
b. Eliminate smoking.
c. Eat slowly in a calm environment.
d. Antidepressant therapy may be prescribed for some patients as a sedative and for relaxation.
e. If a patient is in acute pain when admitted, the diet will require modification to lessen symptoms. The regular diet will be reordered when the pain is gone. Most diet manuals in facilities contain some form of modified diet therapy suitable for these conditions.

Patients and physicians accustomed to the traditional diets have been slow to accept the liberal diet. Most hospitals generally offer the minimum fiber diet initially to ulcer patients (see Chapter 14). Individual changes are made toward a regular diet as the patients and their conditions indicate acceptance and improvement.

Nursing responsibilities in treating ulcer patients are as follows:

1. Explain the rationale for use of the newer diet therapy (some patients are very fearful and skeptical of the less restrictive diet).
2. Evaluate the diet for nutritional adequacy after individual changes have been made.
3. Encourage the consumption of laxative foods, especially if the patient is prescribed antacids, which cause constipation.
4. Explain the adoption of a less stressful lifestyle to help prevent a recurrence.
5. Intervene on the patient’s behalf if the prescribed diet is not tolerated.

GASTRIC SURGERY FOR ULCER DISEASES

Perforation and hemorrhage are two major complications of ulcer disease for which surgery is indicated. The types of surgical procedures can be found in all nursing and medical texts, but space prohibits discussion here. After the initial period of NPO and fluid and electrolyte replacement, and when peristalsis has returned, oral feedings may be resumed. The necessity for optimum nutrition following gastric surgery is the same as in any other operation, but postgastrectomy diet therapy (which must be ordered by the physician) differs in some respects. In general the health practitioner should follow these basic principles:

1. Implement a progressive diet for a 2-week course.
2. Keep meals small (1 to 2 oz each) and frequent (hourly). Low carbohydrate clear liquids with ½ slice toast or two crackers are appropriate for first feedings.
3. Increase the size of feedings by 1 oz daily.
4. Use a six-meal, low-carbohydrate, high-protein, moderate-fat, diet by approximately day 10 to day 16, if conditions permit.
5. Introduce simple, mild, low-fiber, and easily digested foods, such as cream of wheat or rice, sugar-free gelatin, soft-cooked (poached) eggs, mashed potatoes, and tender beef or chicken. Milk and regular carbonated beverages are not included, and liquids are given separately from solid foods. These precautions are to prevent development of the “dumping syndrome.”
6. Resume a regular diet gradually.

The “dumping syndrome” is a complication of gastric surgery that may occur a short time after recovery from the operation, after eating is resumed. It may also be the delayed type, occurring from one to five years after a gastrectomy. It is more likely to occur in the patient who has had two-thirds or more of the stomach removed.

The process is as follows: Food reaches the jejunum 10 to 15 minutes after eating. With part of the stomach removed, the food is not digested properly and, instead of being delivered slowly, it is “dumped” quickly into the small intestine. The patient then experiences nausea, cramping, weakness, dizziness, cold sweating, a rapid pulse, and possibly vomiting. These symptoms of shock occur as the concentrated foodstuff draws water from the body tissues into the intestine. The symptoms are especially severe when the meal is high in simple carbohydrate, which can exert high osmotic pressure. Two to three hours after the meal, hypoglycemic symptoms may occur, because the absorbed monosaccharides, especially glucose, cause a rapid rise in blood glucose. This, in turn, stimulates the body to produce more insulin that quickly removes the excess glucose from the blood, resulting in hypoglycemia.

The aim of diet therapy is to provide the patient with optimum nutrition that will control these symptoms:

1. Small, frequent meals (that will not overload the jejunum) eaten slowly.
2. No liquid during meals and the following hour; the absence of liquid slows absorption.
3. High-protein foods for tissue repair and moderately high-fat foods to add calories and delay the time food is emptied from the stomach.
4. Moderate to low amounts of complex carbohydrate foods (which are digested more slowly).
5. No milk, sugar, sweets, desserts, alcohol, or sweetened beverages. All of these pass rapidly into the jejunum and pull fluid there. Also, simple sugars stimulate insulin release and so should be avoided.
6. Raw foods as tolerated (low-fiber types are usually given).

Table 17-2 presents an antidumping diet, and Table 17-3 provides a sample menu.

NURSING IMPLICATIONS

1. Encourage a supine position after meals to decrease the force of gravity.
2. Advise mouth rinsing before meals as cholinergic blocking agents can cause dryness of mouth.
### TABLE 17-2  Permitted and Prohibited Foods in an Antidumping Diet

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods Permitted</th>
<th>Foods Prohibited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breads</td>
<td>All breads and crackers except those noted</td>
<td>Breads with nuts, jams, or dried fruits or made with bran</td>
</tr>
<tr>
<td>Fats</td>
<td>Margarine, butter, oil, bacon, cream, mayonnaise, French dressing</td>
<td>None</td>
</tr>
<tr>
<td>Cereals and equivalents</td>
<td>All grains, rice, spaghetti, noodles, and macaroni except those noted</td>
<td>Presweetened cereals</td>
</tr>
<tr>
<td>Eggs</td>
<td>All egg dishes</td>
<td>None</td>
</tr>
<tr>
<td>Meats</td>
<td>All tender meats, fish, poultry</td>
<td>Highly seasoned or smoked meats</td>
</tr>
<tr>
<td>Beverages</td>
<td>Tea, coffee, broth, liquid unsweetened gelatin, artificially sweetened soda (½–1 hour before and after meals)*</td>
<td>No milk or alcohol; carbonated beverages if not tolerated; beverages with meal unless symptoms begin to subside†</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Mashed potato, all tender vegetables (peas, carrots, spinach, etc.)</td>
<td>Creamed; gas-forming varieties if not tolerated (cabbage, broccoli, dried beans and peas, etc.)</td>
</tr>
<tr>
<td>Fruits</td>
<td>Fresh or canned (unsweetened or artificially sweetened); one serving citrus fruit or juice</td>
<td>Canned with sugar syrup; avoid sweetened dried fruits; e.g., prunes, figs, dates</td>
</tr>
<tr>
<td>Dairy products</td>
<td>Milk, cheese, cottage cheese, yogurt, etc.</td>
<td>Introduce small amounts of dairy to determine tolerance</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Salt, catsup, mild spices, smooth peanut butter</td>
<td>Pickles, peppers, chili powder, nuts, olives, candy, milk gravies</td>
</tr>
</tbody>
</table>

*Some practitioners prefer 1 to 2 hours before and after meals.
†Some practitioners permit 4 oz of fluid with a meal.

### TABLE 17-3  Sample Menu Plans for Antidumping Diets

<table>
<thead>
<tr>
<th>Soon after Surgery</th>
<th>Later after Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sample 1</td>
</tr>
<tr>
<td><strong>Breakfast</strong></td>
<td></td>
</tr>
<tr>
<td>Egg, poached, 1</td>
<td>Egg, scrambled, 1</td>
</tr>
<tr>
<td>Toast, 1 slice</td>
<td>Toast, 1 slice</td>
</tr>
<tr>
<td>Butter, 1 tsp</td>
<td>Butter, 1 tsp</td>
</tr>
<tr>
<td>Banana, ¼</td>
<td>Peaches, ¼ c</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Snack</strong></td>
<td></td>
</tr>
<tr>
<td>Gelatin, fruit-flavored, unsweetened, 1 c</td>
<td>Smooth peanut butter, 2 oz Crackers, 2</td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
</tr>
<tr>
<td>Chicken breast, stewed, 3 oz</td>
<td>Fish, 3 oz</td>
</tr>
<tr>
<td>Potato, mashed, ¾ c</td>
<td>Rice, ¼ c</td>
</tr>
<tr>
<td>Butter, 2 tsp</td>
<td>Spinach, ¾ c</td>
</tr>
<tr>
<td>Snack</td>
<td>Gelatin, fruit-flavored, unsweetened, 1 c</td>
</tr>
<tr>
<td>Soft-cooked egg Crackers, 4</td>
<td>Butter, 2 tsp</td>
</tr>
<tr>
<td>Dinner</td>
<td></td>
</tr>
<tr>
<td>Meat, 3 oz</td>
<td>Turkey, sliced, 3 oz</td>
</tr>
<tr>
<td>Rice with grated cheese, ¾ c</td>
<td>Potato, baked, 1</td>
</tr>
<tr>
<td>Asparagus, tips, ¾ c</td>
<td>Butter, 2 tsp</td>
</tr>
<tr>
<td>Margarine, 1 tsp</td>
<td>Tomato, 2 slices</td>
</tr>
<tr>
<td>Snack</td>
<td>Bread, 1 slice</td>
</tr>
<tr>
<td>Meat, 2 oz</td>
<td>Peach, halves</td>
</tr>
<tr>
<td>Margarine, 1 tsp</td>
<td>canned, unsweetened</td>
</tr>
</tbody>
</table>
3. Emphasize eating slowly in a relaxed, pleasant environment.
4. Explain the reasons for diet restrictions to the patient and family or care provider.
5. Be aware that vitamin B₁₂ by injection may be necessary following total gastrectomy, because the intrinsic factor necessary for its absorption will be lost. Make sure that the patient understands the need for this treatment.
6. Check weight and caloric intake frequently.

**Progress Check on Activity 1**

**FILL-IN**

1. Fill out the section in Exercise 17-1 for the low-residue diet, listing all diseases or conditions for which this diet is applicable.
2. a. Fill out the section in Exercise 17-1 for foods suitable for a patient with a gastric ulcer.
   b. Repeat Exercise 17-1, using foods suitable for dumping syndrome.
3. Explain the rationale for the important changes in diet therapy for peptic ulcers.
4. Make a 1-day meal plan for a patient who is four days postgastrectomy.

**Activity 2:**

**Disorders of the Intestines**

**Dietary Fiber Intake**

The structural parts of bran, husks of whole grain products, hulls, skins, and seeds are important sources of fiber. A low-fiber and a low-residue diet are not the same. Residue is the portion of the diet that contributes to the content of the feces. Dietary fiber is the portion of food that cannot be digested by the human body.

We can provide the patient with a low-fiber diet or a diet in which the amount of fiber is regulated. This is used for preoperative and postoperative states of lower gastrointestinal surgery or a condition in which decreased fecal bulk is desired such as diverticulitis, ulcerative colitis, Crohn’s disease, or any time stenosis of the esophageal or intestinal lumen occurs. Simply put, we can provide a nutritionally adequate diet that leaves a minimum of residue in the colon by limiting the amount of fiber.

The fiber content of a diet can be reduced with the following practices:

1. Use young, very tender, cooked vegetables.
2. Omit foods with seeds, skin, and structural fiber, such as berries, celery, cabbage, corn, and peas.
3. Peel fruits and vegetables and cook to soften fiber.
4. Puree or strain foods.
5. Use only refined white breads and cereals.
6. Omit fruits and vegetables and use only strained juices.

**Exercise 17-1**

A practice on the dietary management of selected disorders and nursing implications

Complete the chart by filling in the information for each column.

<table>
<thead>
<tr>
<th>Diet</th>
<th>Disease or Condition</th>
<th>Foods Allowed</th>
<th>Foods Limited</th>
<th>Foods Forbidden</th>
<th>Nursing Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Residue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric Ulcer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dumping Syndrome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 17-4 shows the foods permitted in a low- to moderate-fiber or residue-restricted diet. Table 17-5 shows a sample menu for a low- to moderate-fiber or residue-restricted diet.

The most common of the intestinal disorders that occasionally affect people are constipation and diarrhea. Both disorders are usually managed with simple changes in diet and lifestyle. Other, more severe intestinal conditions are diverticular disease, inflammatory bowel disease (IBD), and cancer.

**CONSTIPATION**

Because constipation is a symptom, many variables have been implicated in its treatment. One cause is related to the stress and strain of modern life. Poor personal habits may be responsible, including irregular routine and meals, inadequate rest and exercise, tension, and ignoring the body’s need to defecate. Some medications that contain iron, aluminum, or calcium can cause constipation. Regular use of laxatives also is a contributing

<table>
<thead>
<tr>
<th>TABLE 17-4 Foods Permitted in Low- to Moderate-Fiber or Residue-Restricted Diets</th>
<th>Foods and Daily Servings Permitted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meat, equivalents</strong></td>
<td>Beef, veal, ham, liver, and poultry (broiled, baked, or stewed to tender); fish, fresh or salt (broiled, baked); canned tuna or salmon; shellfish, tender meat only</td>
</tr>
<tr>
<td><strong>Milk, milk products</strong></td>
<td>Whole, skim, chocolate; buttermilk, yogurt (2 c daily including amount in food preparation)</td>
</tr>
<tr>
<td><strong>Cheese</strong></td>
<td>Cottage, cream, American, Muenster, and Swiss</td>
</tr>
<tr>
<td></td>
<td>1 c milk = 1 oz cheese</td>
</tr>
<tr>
<td><strong>Eggs</strong></td>
<td>All varieties except fried</td>
</tr>
<tr>
<td><strong>Grain, grain products</strong></td>
<td>Bread (Italian, Vienna, or French); toast (French or melba); crackers (saltines or soda); rolls (plain, soft, or hard); others: biscuits, zwieback, rusk</td>
</tr>
<tr>
<td></td>
<td>All above prepared with refined whole wheat or rye</td>
</tr>
<tr>
<td></td>
<td>Cereals (ready-to-eat, cooked, all prepared from refined grains); oatmeal</td>
</tr>
<tr>
<td></td>
<td>Flours from refined grains other than graham or bran</td>
</tr>
<tr>
<td></td>
<td>White rice</td>
</tr>
<tr>
<td></td>
<td>Plain spaghetti, noodles, and macaroni</td>
</tr>
<tr>
<td><strong>Potatoes</strong></td>
<td>Potatoes without skin (creamed, mashed, scalloped, boiled, baked); sweet potatoes without skin</td>
</tr>
<tr>
<td><strong>Fruits</strong></td>
<td>Daily allowance: 2 servings</td>
</tr>
<tr>
<td></td>
<td>All juices and nectars; fruit, ripe and fresh (peeled, without seeds), frozen, or canned; grapes, bananas, apricots, plums, peaches, pears, cherries, avocados, citrus fruits (segments only; e.g., oranges, grapefruit, tangerine, honeydew, cantaloupe, pineapple, and nectarines)</td>
</tr>
<tr>
<td><strong>Vegetables</strong></td>
<td>Daily allowance: 1 serving for vegetables, with no limitation on juices</td>
</tr>
<tr>
<td></td>
<td>Vegetables, well-cooked or canned: green and waxed beans, carrots, asparagus, beets, eggplant, mushrooms, onions, cauliflower, peas, winter squash, pumpkin, cabbage</td>
</tr>
<tr>
<td></td>
<td>Vegetables, cooked, chopped: turnip greens, broccoli, spinach, kale, collards</td>
</tr>
<tr>
<td></td>
<td>Vegetables, raw, chopped: lettuce</td>
</tr>
<tr>
<td><strong>Beverages</strong></td>
<td>Coffee (regular, decaffeinated), tea; others: soft drinks, cereal beverages</td>
</tr>
<tr>
<td></td>
<td>All drinks may be flavored with permitted fruits.</td>
</tr>
<tr>
<td></td>
<td>Broth and cream-based soups made from other permitted ingredients</td>
</tr>
<tr>
<td><strong>Candies, sweets</strong></td>
<td>Plain candies, jelly, honey, syrup, sugar, jelly beans, mints</td>
</tr>
<tr>
<td><strong>Fats</strong></td>
<td>Cream: regular, dried substitutes, sour; dressings: mayonnaise and mayonnaise-type, all must be plain; regular smooth salad oil; butter, margarine, oils; others: crisp bacon, shortenings</td>
</tr>
<tr>
<td><strong>Desserts</strong></td>
<td>All must be plain and made from permitted ingredients: pie, cakes, cookies, pudding, gelatin, sherbet, ice cream</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td>Spices and herbs (ground or finely chopped); flavorings: soy sauce, vinegar, salt, monosodium glutamate, chocolate, catsup, and all commercial flavoring extracts; sauces and gravies: mild and made from permitted ingredients</td>
</tr>
</tbody>
</table>
factor. Ideal treatment requires adopting good health habits to restore regularity and break the laxative cycle.

A regular balanced diet high in fiber and fluids is recommended to avoid constipation. Eight to ten glasses of fluids daily should be consumed. Foods high in fiber include whole grains and raw fruits and vegetables. If the patient cannot tolerate the latter, cooked ones may be used. Prune juice, apple juice, figs, and raisins are especially helpful. Bran with a high fiber content is an effective agent.

Nursing Implications
1. Explain the benefits of a high-fiber diet. In addition to increasing bulk, the foods that provide fiber are high in vitamins and minerals.
2. Discourage regular and excessive use of laxatives.
3. Reassure patients that a daily bowel movement is not an absolute necessity. It may not be normal for them.
4. Advise gradual inclusion of high-fiber foods in the diet. Excess dietary fiber at the beginning may cause cramping and gas. This can discourage patients from continuing the diet.
5. Encourage a high fluid intake, especially of water.

DIARRHEA

Diarrhea in infants, small children, and the elderly can be serious if prolonged, especially if an infection is present. Common mild diarrhea of short duration usually responds well to simple treatment. Diarrhea is functional when related to stress, irritation of the bowel, or a change in the regular routine, such as traveling. It is organic if it is caused by a GI lesion. Treatment includes eliminating the underlying cause, using antidiarrheal drugs as needed, and using appropriate diet therapy.

Diet therapy during severe diarrhea is characterized by the following:
1. No oral feeding for first 24 to 48 hours. Intravenous (IV) fluids are used to replace electrolytes and water.
2. If the need for IV fluids continues beyond 72 hours, amino acids and vitamins may be added. If diarrhea is prolonged, total parenteral nutrition (TPN) is necessary.
3. Resumption of oral feedings: First day include clear liquids with a minimum of sugar. Second day progressively introduce a minimum-residue diet (see Tables 17-4 and 17-5), high in protein. Calcium supplements are provided. Applesauce and raw apples may be used for their pectin content, which can thicken the stools. Implement gradual progression of a low-fiber, low-residue, soft, solid-to-regular diet as the situation improves.

Mild diarrhea usually responds to the following: reducing the total food intake, especially carbohydrate and fat; limiting residue; and replacing fluids. A bland low-residue diet may ease the discomfort.

Nursing implications for individuals or patients with diarrhea:
1. Note daily weight changes.
2. Keep accurate daily records of intake and output.
3. Do not permit carbonated beverages. Use flat soda or ginger ale if carbonated beverages are desired.
4. Relieve any pain before serving meals.
5. Employ diversionary tactics during meals.
6. Offer replacements later, if patient does not finish food when it is first offered.

DIVERTICULAR DISEASE

Diverticuli are herniations (pockets or sacs) of intestinal mucosa through the muscles of the bowel wall. The process is referred to as diverticulosis. If accompanied by inflammation, the disorder is called diverticulitis. It is important to distinguish between the two, as the diet therapy used is different for each.

One cause of diverticulosis appears to be related to a lack of fecal bulk, which increases intraluminal pressure.
The treatment of diverticulitis is aimed at preventing inflammation. A high-fiber diet is prescribed. Fiber sources include bran, whole grains, and fruits and vegetables. Pepper and chili powder, sometimes nuts and corn, may be eliminated.

Diverticulitis requires special attention. During acute periods when the diverticuli are inflamed and there is pain, tenderness, nausea, vomiting, and distention, fecal residue may add to the discomfort. Diet therapy during this period may be limited to clear liquids progressing to full liquids, then to low-residue and to regular high-fiber diet as the inflammation subsides. Severe diverticulitis is usually treated by surgical methods (colostomy, bowel resection).

Nursing implications are as follows:
1. Patient education is most important here, as all diverticular disease was formerly treated with a low-residue diet.
2. The older patient should be especially reassured, as most diverticulosis occurs in the elderly, and they become most anxious on a high-fiber diet.
3. A symptomatic patient should be encouraged to rest and to take medicines as prescribed.
4. Patients who are malnourished on admission should be replenished nutritionally to facilitate healing and recovery.

**INFLAMMATORY BOWEL DISEASE**

Inflammatory bowel disease is a term used for ulcerative colitis and Crohn’s disease. Both may have the related condition of short bowel syndrome if there have been repeated surgeries that removed sections of the bowel as the disease progressed.

Both ulcerative colitis (UC) and Crohn’s disease have increased in incidence in the United States. They have similar pathophysiology and clinical symptoms, but are prevalent in different groups. They both have severe nutritional consequences, but are separate diseases. Crohn’s can occur anywhere in the GI tract, but UC is confined to the colon and rectum. The pattern of disease in Crohn’s is that of a chronic disorder, often involving the entire intestinal wall. This may cause complications, such as partial or complete obstruction and the formation of fistulas. The inflammatory processes in UC, on the other hand, are usually acute and are limited to the mucosa and submucosa of the intestine. The patient may have periods of remission.

Diet therapy for inflammatory bowel disease is based upon the common clinical symptoms of bloody diarrhea and the various associated nutritional problems.

**Ulcerative Colitis (UC)**

Primarily a disease of young adults, especially women, ulcerative colitis is a life-threatening disorder. While the cause is unknown, one major culprit is related to psychological factors. The disorder is characterized by widespread ulceration and inflammation of the colon, fever, chronic bloody diarrhea, edema, and anemia. The patient is severely malnourished, suffering from avitaminosis, negative nitrogen balance, dehydration, electrolyte imbalances, and skin lesions. Patients are nervous, anorexic, and in pain. The obvious need for maximum nutrition for a patient who cannot eat is a challenge to the health team.

The treatment of UC includes rest, sedation, antibiotics, antidiarrheal drugs, and rigorous diet therapy. Surgical removal of the diseased portion of the bowel is the treatment of choice, if other medical procedures fail. Diet therapy includes the following:

1. A regular, high-fiber diet supplemented with formula feeding, as tolerated
2. High protein: 125 to 150 g
3. High calorie: 3000 + calories
4. High vitamins/minerals, especially vitamins C, B complex, and K
5. Moderate fat or as tolerated
6. Dairy products usually eliminated to avoid secondary lactose intolerance, or lactose-free products used
7. IV fluids used in addition to oral feedings to correct fluid and electrolyte losses due to diarrhea
8. TPN is most effective when the bowel has been shortened or the disease is extensive

**Crohn’s Disease**

Crohn’s disease is another manifestation of inflammatory bowel disease. It is particularly prevalent in industrial areas and among the 55 to 60 age group. It has an insidious onset and is characterized by tenderness, pain, diarrhea, and cramping in the right lower quadrant of the bowel. There is less blood in the stool than in ulcerative colitis, but increased secretion of mucus by the bowel. The patient runs a low-grade fever.

Widespread involvement of the small bowel results in malabsorption of fat, protein, carbohydrates, vitamins, and minerals, and subsequent weight loss. Vitamin B₁₂ deficiency may occur, leading to macrocytic anemia and neurologic damage. Bile salt losses lead to cholelithiasis, diarrhea, and steatorrhea. There may also be anemia due to loss of blood in the stool. Children with Crohn’s disease show retarded growth patterns.

As with UC, the effects of malabsorption are widespread. Malabsorption of vitamins C and K leads to capillary fragility, hemorrhagic tendencies, and petechiae. Malabsorption of calcium and vitamin D puts the patient at risk for osteomalacia and osteoporosis. The bone pain that is a frequent symptom of both UC and Crohn’s is due to this impairment. Tetany and paresthesia are also related to calcium and magnesium malabsorption. The
whole vitamin B complex is destroyed, giving rise to glossitis, cheilosis, skin changes, and peripheral neuritis.

The rational for diet therapy for both diseases is to restore nutrient deficits, prevent further losses, promote healing, and repair and maintain body tissue.

**NURSING IMPLICATIONS**

Nursing responsibilities for patients with ulcerative colitis or Crohn’s disease include the following:

1. Be aware that the patient’s need for high levels of food and fluids parallels that of a burn patient.
2. Interpret the diet to the patient and family member or care provider. A young person on a bland low-residue diet for long periods of time becomes discouraged.
3. Be aware that, if steroid-type medication is used, sodium restriction may also become necessary.
4. Do not confuse fluid retention with nutritional improvement (body weight gain).
5. Keep careful daily records: fluid intake and output, weight changes, nutrient intake, and calorie counts.
6. Seek outside resources for the patient (counselor, therapist) as needed. Work closely with dietitian and other health team members.
7. Provide the patient with the rationale for strict medical management and the side effects of same.
8. Provide education for continuing diet therapy for UC and Crohn’s. It is based on:
   a. Restoring adequate nutrition intake
   b. Correcting deficits, usually with supplements
   c. Preventing further losses
   d. Controlling substances that do not absorb well, such as fats
   e. Promoting the healing and repairing and maintaining of tissue
9. Any number of commercial preparations to add additional calories in easily digestible form may be obtained from the local pharmacy, (MCT, Portagen, etc.).
10. The diet for both UC and Crohn’s remains:
    a. High protein: 120%–150% of the RDA. Assuming 60 g/day as recommended for healthy adults, the diet would contain from 72–90 g/day of HBV protein.
    b. High vitamin, especially those found to be most deficient.
    c. High minerals as needed by the individual (especially iron, which may be administered by transfusion; calcium, zinc, and potassium if diarrhea persists).
    d. Low residue to regular. Recent research indicates that the low-residue diet as diet of choice for IBD may become obsolete, as the bland low-residue diet did for diverticulosis and ulcers. Five-year trials of patients with IBD showed that a regular diet with appropriate increases in protein, vitamins, minerals, and calories for healing leads to more improvement and fewer hospitalizations than traditional diet therapy. While more research will be necessary to confirm this study, the nurse should stay abreast of the changing nature of diet therapy.
    e. High calorie to spare the protein for tissue healing and rebuilding.
    f. Supplemental defined formula as needed.

**GASTRIC SURGERY FOR SEVERE OBESITY**

According to the National Institutes of Diabetes, Digestive, and Kidney Diseases, stomach surgery is one option for severe obesity. Severe obesity is a chronic condition that is difficult to treat through diet and exercise alone. Gastrointestinal surgery is the best option for people who are severely obese and cannot lose weight by traditional means or who suffer from serious obesity-related health problems. The surgery promotes weight loss by restricting food intake and, in some operations, interrupting the digestive process. As in other treatments for obesity, the best results are achieved with healthy eating behaviors and regular physical activity.

People who may consider gastrointestinal surgery include those with a body mass index (BMI) above 40, about 100 pounds of overweight for men and 80 pounds for women (see Appendix B for a BMI conversion chart). People with a BMI between 35 and 40 who suffer from type 2 diabetes or life-threatening cardiopulmonary problems such as severe sleep apnea or obesity-related heart disease may also be candidates for surgery.

Gastrointestinal surgery for obesity, also called bariatric surgery, alters the digestive process. The operations promote weight loss by closing off parts of the stomach to make it smaller. Operations that only reduce stomach size are known as restrictive operations, because they restrict the amount of food the stomach can hold. Some operations combine stomach restriction with a partial bypass of the small intestine. These procedures create a direct connection from the stomach to the lower segment of the small intestine, literally bypassing portions of the digestive tract that absorb calories and nutrients. These are known as malabsorptive operations.

**Restrictive Operations**

As a result of this surgery, most people lose the ability to eat large amounts of food at one time. After an operation, the person usually can eat only 3⁄4 to 1 cup of food without discomfort or nausea. Also, food has to be well chewed. Although restrictive operations lead to weight loss in almost all patients, they are less successful than malabsorptive operations in achieving substantial, long-term weight loss. About 30% of those who undergo this
surgery achieve normal weight, and about 80% achieve some degree of weight loss. Some patients regain weight. Others are unable to adjust their eating habits and fail to lose the desired weight. Successful results depend on the patient’s willingness to adopt a long-term plan of healthy eating and regular physical activity.

A common risk of restrictive operations is vomiting, which is caused when the small stomach is overly stretched by food particles that have not been chewed well. In a small number of cases, stomach juices may leak into the abdomen, requiring an emergency operation. In less than 1% of all cases, infection or death from complications may occur.

Malabsorptive Operations

In addition to the risks of restrictive surgeries, malabsorptive operations also carry greater risk for nutritional deficiencies. This is because the procedure causes food to bypass the duodenum and jejunum, where most iron and calcium are absorbed. Menstruating women may develop anemia because not enough vitamin B12 and iron are absorbed. Decreased absorption of calcium may also bring on osteoporosis and metabolic bone disease. Patients are required to take nutritional supplements that usually prevent these deficiencies. Depending on the particular method of bypass, some patients must also take water-soluble vitamins A, D, E, and K supplements.

These operations may also cause dumping syndrome. This means that stomach contents move too rapidly through the small intestine. Symptoms include nausea, weakness, sweating, faintness, and sometimes diarrhea after eating.

The more extensive the bypass, the greater the risk for complications and nutritional deficiencies. Patients with extensive bypasses of the normal digestive process require close monitoring and life-long use of special foods, supplements, and medications.

Surgery to produce weight loss is a serious undertaking. Anyone thinking about surgery should understand what the operation involves. Patients and physicians should carefully consider the benefits and risks.

COLOSTOMY AND ILEOSTOMY

Many intestinal diseases not responsive to medical and dietary measures must be treated surgically. Depending on the location of the obstruction or disease, a colostomy or an ileostomy may be performed.

Colostomy

In a colostomy, the rectum and anus are removed. The remaining intestine is led to the outside through a hole in the abdomen. Because this surgical procedure diverts fecal material from the distal colon and rectum, where fluids are normally absorbed, patients with colostomies have stools with high water content.

Diet therapy is characterized by the following:

1. A well-balanced diet that is appropriate for the preoperative patient is indicated. See Chapter 15 for diet planning.
2. The initial postoperative diet is clear liquid, followed by a high-soluble fiber diet as tolerated. Progress as rapidly as possible to a regular diet. Nutrient supplements are provided as needed.
3. General goals are to promote healing and prevent odor, constipation, and diarrhea.
4. Each patient must experiment with the diet. The patient can identify those foods to be limited or avoided.

The nursing implications in caring for this group of patients include the following:

1. Colostomy patients have real concerns about odors and flatulence. Help them with corrective measures. For example, spinach and parsley have deodorizing action and a commercial deodorant may be used in the bag.
2. A diet must be evaluated for adequacy, if certain food items are prohibited.
3. Eating slowly and thorough chewing can prevent swallowing air.
4. Patients with colostomy usually progress rapidly as they gain control over the elimination process and adapt well to changes in lifestyle.
5. Emotional support for the patient and family is mandatory.
6. Compile information regarding outside resources that will help patients.

Ileostomy

This surgery is indicated for intractable ulcerative colitis, Crohn’s disease, and cancer of the colon. An ileostomy bypasses the colon and rectum, and the distal ileum is led to the outside of the body through an opening in the abdomen. Since the surgery is performed higher in the intestine, the waste material is mainly in fluid form. There are great losses of fluid, sodium, vitamin K, and other essential nutrients. Fat absorption is poor and vitamin B12 absorption is reduced or absent. Body-weight loss is high.

Diet therapy after the operation is as follows:

1. The diet progresses from clear liquids to a high-soluble fiber diet as tolerated. New foods are given one at a time to test the patient’s tolerance.
2. Nutritional supplements and/or TPN may be needed in the early stages.
3. Vitamin B12 injections are given at scheduled times to prevent pernicious anemia.
4. Extra fluid is required. Orange juice and bananas are high in potassium, while extra salt with food increases sodium intake.
5. The progression to a regular diet is longer for the patient with an ileostomy than a patient with a colostomy.

**NURSING IMPLICATIONS**

Nursing implications for caring for this group of patients include the following:

1. Provide emotional support and encouragement to eating adequately.
2. Work closely with the dietary department, and plan for the family of the patient to participate.
3. Be aware that the same nursing measures are applicable to colostomy and ileostomy patients.
4. Become familiar with obesity and the role of surgery. The nurse's role is extremely important before, during, and after the operation. Apart from clinical nursing considerations, the significant role of nutrition in patient care during these three phases should be acknowledged. The implementation of proper enteral and parenteral nutrition revolves around the close working relationships among the doctor, the nurse, and the dietitian.

**Progress Check on Activity 2**

**MATCHING**

1. Indicate which of the following foods would be allowed on a minimum-residue diet by writing Y (yes) or N (no) in the blanks:

   - a. broccoli with hollandaise sauce
   - b. bouillon
   - c. applesauce
   - d. fresh pears
   - e. sherbet
   - f. fruitcake
   - g. poached egg
   - h. macaroni
   - i. pecan waffles
   - j. broiled chicken

**MULTIPLE CHOICE**

Circle the letter of the correct answer.

2. Residue is that part of food that:
   - a. remains longest in the GI tract.
   - b. is indigestible.
   - c. is left uneaten after the meal.
   - d. is inedible.

3. IBD is the result of which of these factors?
   - a. short bowel syndrome
   - b. infectious processes
   - c. inadequate diets
   - d. malabsorption

4. An appropriate diet for the patient with IBD would allow the basic principles of optimum nutrition and would:
   - a. be increased in fiber.
   - b. contain extra fats for energy.
   - c. be decreased in fiber.
   - d. be decreased in sodium.

5. Patients with colostomies usually gain control of evacuation faster than patients with ileostomies because:
   - a. they have better preoperative nutritional status.
   - b. they have better neuromuscular functions.
   - c. the surgery site is lower in the gut.
   - d. the surgical site heals more quickly.

6. General goals of diet therapy following a colostomy are to promote healing and prevent:
   - a. constipation.
   - b. diarrhea.
   - c. odors.
   - d. all of the above.

7. The restricted-residue diet:
   - a. is always very high in calories.
   - b. is very similar to the full-liquid diet.
   - c. may be inadequate in vitamins and minerals.
   - d. is nutritionally adequate.

8. The minimum-residue diet:
   - a. is always very high in calories.
   - b. is very similar to the full-liquid diet.
   - c. may be inadequate in vitamins and minerals.
   - d. is nutritionally adequate.

9. Which of the following foods are allowed on a minimum-residue diet?
   - a. milkshake, hamburger, and french fries
   - b. tomato wedge, scrambled egg, and broiled bacon
   - c. chicken sandwich on white bread with butter
   - d. all of the above

10. Which of these foods would be included in a high-fiber diet?
    - a. whole wheat bread, prunes, celery
    - b. carrot sticks, bran cereal, apples
    - c. coconut bars, pecan rolls, oatmeal
    - d. all of the above

11. If the minimum-residue diet must be used for a period of time, the physician should:
    - a. alternate it weekly with the high-iron diet.
    - b. substitute the full-liquid diet.
c. add fresh fruit juices before each meal.
d. prescribe a vitamin and mineral supplement.

**FILL-IN**

12. Name 10 foods high in fiber content.
   a. 
   b. 
   c. 
   d. 
   e. 
   f. 
   g. 
   h. 
   i. 
   j. 

13. List five goals for feeding a patient with an inflammatory bowel disease.
   a. 
   b. 
   c. 
   d. 
   e. 

14. List five nursing implications for nutritional care of the osteomate.
   a. 
   b. 
   c. 
   d. 
   e. 

**TRUE/FALSE**

Circle T for True and F for False.

15. T F Severe obesity is a chronic condition that does not respond to treatment through diet and exercise alone.
16. T F Bypass surgery should be considered for a female who is 30 pounds overweight.
17. T F Following bypass surgery, a patient should be able to resume original eating habits to control body weight.
18. T F Restrictive surgeries for chronic obesity promote weight loss by decreasing the size of the stomach.
19. T F Malabsorptive operations may cause nutritional deficiencies because the diet therapy is too restrictive.
20. T F The nurse’s role in the nutritional care of a patient with bypass surgery is extremely important before, during, and after the operation.

**REFERENCES**


CHAPTER 18

Diet Therapy for Diabetes Mellitus

Time for completion
Activities: 1½ hours
Optional examination: ½ hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:

1. Explain the use of the exchange system in dietary control.
2. Identify the exchange groups and their subcategories.
3. List the carbohydrate, protein, fat, and energy values of each list of foods in the exchange groups.
4. Plan an appropriate menu for a person with a clinical condition that requires a calculated diet.
5. Describe the use of the calculated diet in controlling diabetes mellitus.
6. Describe the use of the calculated diet in controlling weight.
7. Describe the nursing implications appropriate to the disorders.

GLOSSARY

Atherosclerosis: formation of plaques containing cholesterol and other liquid material within the lumina of the arteries.
Endogenous: produced within the body.
PART III NUTRITION AND DIET THERAPY FOR ADULTS

Gestational diabetes: A high blood glucose level that develops during pregnancy. Usually there is a return to normal following childbirth, but these women may develop NIDDM later in life.

Glycemic index: A measurement of how fast starches and sugars metabolize in the blood stream. It indicates how quickly specific foods affect blood sugar levels based on a scale of 1 to 100. Glycemic control refers to the use of these specific foods to help control blood sugar levels. The application of this concept is still being debated and, therefore, will not be included in this chapter.

High biological value: refers to complete proteins that supply abundant amounts of essential amino acids for synthesis of new tissues.

Hyperglycemia: condition that occurs when the glucose in the blood exceeds the normal range (the normal range for blood sugar levels is 70 to 120 mg/ml).

Hypoglycemia: condition that occurs when the glucose in the blood falls below normal range.

Hypoglycemic agent: a drug sometimes used by diabetics not receiving insulin to assist in lowering blood sugar levels. It is not a hormone.

IDDM: insulin-dependent diabetes mellitus.

Insulin: hormone produced in the beta cells of the pancreas that controls blood glucose levels. It is the only hormone that lowers blood sugar.

Ketoacidosis: formation and accumulation of ketone bodies in body tissues and fluids.

NIDDM: Non-insulin-dependent diabetes mellitus.

Polydipsia: excessive thirst.

Polyphagia: excessive hunger.

Polyunsaturated: a fat that has two or more double bonds into which hydrogen can be added.

Polyuria: excessive urination.

Triglycerides: the type of fat that is the body’s main form of stored energy.

BACKGROUND INFORMATION

In 2007, the American Dietetic and Diabetes Associations updated its 2003 food exchange lists for diabetic patients. However, the principles and basic guidelines remain the same in the new revision with the following differences:

1. There is a large increase in the number of entries for food items.
2. The nutritional contributions of each food are provided for: gm/serving, protein, fat, carbohydrate, saturated fatty acids, trans fats, polyunsaturated fats, cholesterol, sodium, fiber, and sugars.
3. The source of data for each food is identified when available, e.g., U.S. Department of Agriculture, food labels, and so on.
4. Enable a patient to raise or lower caloric content as needed.

However, we will provide examples of foods selected from the 2007 edition. Also for ease of use, we exclude the complete listing of nutrient data for each selected food in Appendix F. The instructors will provide an explanation for the extent of coverage of the food exchange lists in this chapter. Also, the Web sites of the two professional organizations are making available the complete 2007 food exchange lists.

As explained in Chapter 1, the exchange lists remain the definitive tool used to plan diet therapy for persons with diabetes, and may be modified to meet specific needs.

The caloric value of a diet can be regulated by the number of servings allowed per day from each group. Obviously, the number of servings will depend on how many calories are prescribed in the diet plan, which depends on age, gender, and activity level, and if that individual needs to lose or gain weight.

Consistent with the 3rd edition (2001) of the NCEP guidelines as discussed in Chapter 1, the diet should contain not more than 25%–35% of total calories from fat. Of this amount, not more than 7% should come from saturated fat. Review Chapter 16 for particulars on the NCEP guidelines.

Product labels provide valuable information regarding the types of fats in products, although the percent of trans fats does not appear on labels at present.

Because of the incidence of atherosclerosis in patients with non-insulin-dependent diabetes mellitus (NIDDM), the kind of fats used is an important factor in diet management.

Control of the diet is still depending on the monitoring of the total amount of carbohydrate and the type of fats used. For clients who need to limit their sodium intake, foods in each list that contain 400 mg or more of sodium are marked with a symbol (a salt shaker).

The use of food exchange groups will not be new to the student who has studied the information on normal nutrition in Part I. Only a brief review of the principles is provided here. As explained above, Appendix F lists selected foods from the 2007 edition of the food exchange lists. These food groups are useful because they do the following:

1. Permit nutrients to be counted in foods.
2. Facilitate meal planning by balancing the meal with choices from each group.
3. Enable a patient to comply with diet instructions with minimal effort because of their easy application.
4. Allow a certain flexibility and variety, and reduce diet monotony.
5. Emphasize foods containing more fiber and foods low in sodium.
6. Ensure a reduced intake of saturated fats and cholesterol by a systematic procedure.
7. Enable a patient to raise or lower caloric content as needed.
8. Teach food selection in a practical way.
9. Regulate the intake of carbohydrate, protein, and fat, and permit the calculation of a diet for the overweight, underweight, or diabetic patient.

The exchange groups and their assigned values are listed in Table 18-1.

The student should remember the caloric values for the three major nutrients: carbohydrate: 1 g = 4 calories; protein: 1 g = 4 calories; fat: 1 g = 9 calories. While alcohol is not a nutrient, it furnishes 7 calories per gram and is a factor to be considered in weight control. Because body fat contains some water, a pound of body fat equals 3500 calories. Diet calculations are based on calories per kilogram (kg) of body weight. The conversion 1 kg = 2.2 lb is important.

**ACTIVITY 1:**

**Diet Therapy and Diabetes Mellitus**

Diabetes mellitus is characterized by an inability to metabolize carbohydrate due to a deficiency of insulin or a deficiency of receptor sites. The metabolism of protein and fat is also affected.

Glucose is the form of carbohydrate that is carried in the blood; all carbohydrate breaks down to glucose. Without glucose, the cells have no energy source and have to use muscle protein and tissue fat as an alternate. Without insulin, glucose cannot go from the blood into the cells. This glucose accumulates in the blood, producing hyperglycemia. The sources of blood glucose are:

1. Carbohydrate (CHO): 100% of digestible CHO converted to glucose.
2. Protein: 58% converted to glucose.
3. Fat: 10% converted to glucose.
4. Glycogen (the liver’s emergency supply of carbohydrate): converted to glucose when other sources are used up. Muscle tissue also contains glycogen that may be used in emergencies.

Blood glucose is controlled by two hormones from the beta cells of the pancreas: insulin, which lowers blood sugar, and glucagon, which raises it. A third hormone, somatostatin, regulates the secretions of these two hormones.

**TREATMENT AND DIET THERAPY**

Although the cornerstone of treatment for diabetes mellitus is diet therapy, there are some differences in the way that the therapy is applied, depending upon the type of diabetes present.

The general classification of diabetes is based upon two major types: type I, insulin-dependent diabetes mellitus (IDDM); and type II, non-insulin-dependent diabetes mellitus (NIDDM). Eighty-five to ninety percent of the diabetic population is non-insulin dependent; the other 10 to 15 percent is insulin-dependent. The following discussion illustrates some of the similarities and differences between these types of diabetes.

<table>
<thead>
<tr>
<th>TABLE 18-1 Outline of the American Diabetes Association Food Exchange Lists</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food Group</strong></td>
</tr>
<tr>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>1.</td>
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<tr>
<td></td>
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<tr>
<td>2.</td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*Or 1 starch, or 1 fruit, or 1 milk. Some will also count as 1 or more fat(s).
Type I—IDDM
This is the most severe form of diabetes, occurring most often in childhood or young adulthood. It may, or may not, be an inherited trait. Recent research indicates that the islet cells of the pancreas may have been damaged, either by a disease (such as rubella) or by certain chemicals that were toxic, which led to the onset of the disease. The classic symptoms of IDDM are polydipsia, polyphagia, and polyuria, accompanied by rapid weight loss and often ketoacidosis.

IDDM has a rapid onset, is very unstable, and causes metabolic imbalances that are difficult to control. For these reasons the diet is very carefully planned and coordinated with the insulin and exercise regime. Failure to time and regulate the meals with these factors will result in great fluctuations in blood glucose, ranging from acute hypoglycemia to extreme hyperglycemia. Diet therapy is discussed at length later in this chapter.

Type II—NIDDM
NIDDM has a much stronger genetic link than does IDDM. The majority of these clients are older adults because the onset is slow, and they are usually obese. Some endogenous insulin is still produced, making it unnecessary for them to take insulin, except in unusual situations (such as surgery or other stressors). Obesity, physical inactivity, and hypertension are strong risk factors for the onset of NIDDM. The symptoms are similar to those of IDDM, except there is no weight loss and very rarely ketoacidosis. NIDDM is a milder form of diabetes and is most often controlled with weight loss and an exercise program. Occasionally an oral hypoglycemic drug will be necessary.

Persons with NIDDM have a high incidence of atherosclerosis, making it advisable to counsel them on the need for reduced fat intake as well as reduced calories. As we have advanced in our knowledge of treatments for diabetes, diabetic persons are living longer. They have increased risks of developing major complications such as kidney disease, vascular disease, nerve impairment, and diseases of the retina of the eye. In fact, as much as 20% of the diabetic population becomes blind. Fluctuations of blood glucose from uncontrolled diabetes are thought to be one important factor in the onset of these conditions, making it even more imperative to manage and monitor the diet carefully.

BASIC NUTRITION REQUIREMENTS
Basic nutrition requirements will be determined by several factors. Some of the guidelines used are physical assessment, health and diet histories, and laboratory reports. These factors, combined with the psychological aspects of the client, will help the physician or healthcare specialist determine the diet prescription.

Nutrient Balance
In the most widely used diabetic diet plans, daily carbohydrate intake provides 50%–55% of the daily caloric requirement. Protein of high biological value is emphasized for diabetic diets, especially for children and adolescents. Protein provides 15%–20% of the daily caloric intake. Emphasis is placed on using polyunsaturated fats and limiting cholesterol in the remaining 30% of calories permitted for dietary fat.

An example will serve to illustrate the concept of nutrient balance: Mr. X is placed on a 1500 calorie per day diabetic diet. The nutrient balance is 50% carbohydrate, 20% protein, and 30% fat. What is the number of grams of each nutrient used in the daily diet plan?

1. Carbohydrate
   \[1500 \text{ calories} \times \frac{0.50}{1} = 750 \text{ calories}\]
   \[750 \text{ calories/(4 calories/g)} = \frac{750}{4} \text{ g carbohydrate, rounded to 190 g}\]

2. Protein
   \[1500 \text{ calories} \times \frac{0.20}{1} = 300 \text{ calories}\]
   \[300 \text{ calories/(4 calories/g)} = \frac{300}{4} \text{ g protein}\]

3. Fat
   \[1500 \text{ calories} \times \frac{0.30}{1} = 450 \text{ calories}\]
   \[450 \text{ calories/(9 calories/g)} = \frac{450}{9} \text{ g fat}\]

The diet prescription will be 190 g carbohydrate, 75 g protein, and 50 g fat. The amount of food from each of the exchange lists will be chosen to satisfy these nutrient requirements.

Alcohol usage is determined by the attending physician. Because alcohol contains 7 calories per gram and no nutrients, it is usually substituted for fats in the diet. A chart showing the caloric content of individual servings of alcohol (one glass of wine or one glass of beer, for example) helps those diabetics who drink.

CALORIC REQUIREMENTS
Daily caloric need includes basal metabolism, activity rate, and physiological stress (such as a growth spurt or pregnancy). If the patient is overweight, the caloric range is usually 1200 to 1500 calories per day. If the patient is thin, young (growing), and male, it may be as high as 4000 calories per day.

Tables 18-2A and 18-2B contain food plans at four caloric levels, using the exchange system. They also meet the nutrient balance concept, as previously discussed, of approximately 50% carbohydrate, 20% protein, and 30% fat. Complex carbohydrates containing good amounts of fiber are emphasized when menu planning is done, as well as the use of lean protein foods and very little animal fat. There are many ways to calculate daily caloric need for an adult diabetic patient. The methods include the three categories discussed in the following sections.
### TABLE 18-2A Meal Plans at Four Caloric Levels Using the Exchange System

<table>
<thead>
<tr>
<th>Food Group</th>
<th>1000 kcal</th>
<th>1200 kcal</th>
<th>1500 kcal</th>
<th>1800 kcal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrates group*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch/bread list</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Vegetable list</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Fruit list</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Milk list (skim)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Meat and meat substitute group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat (lean)</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Fat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyunsaturated</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Monounsaturated</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Saturated</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*Foods from the “Other Carbohydrates” list may be substituted for any foods in the carbohydrate group, as long as they do not exceed the total carbohydrate for the day and/or result in a diet that does not meet the criteria for nutritional adequacy (balance).

### TABLE 18-2B Meal Plans for Four Caloric Levels Using the Exchange System

<table>
<thead>
<tr>
<th>Menu Pattern</th>
<th>Food Group</th>
<th>1000 kcal</th>
<th>1200 kcal</th>
<th>1500 kcal</th>
<th>1800 kcal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>Carbohydrates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starch/bread</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fruit</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Milk</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
</tr>
<tr>
<td></td>
<td>Meat or meat substitute</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fat</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lunch</td>
<td>Carbohydrates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starch/bread</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Vegetable</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fruit</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Milk</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
</tr>
<tr>
<td></td>
<td>Meat</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fat</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Dinner</td>
<td>Carbohydrates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starch/bread</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Vegetable</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fruit</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Milk</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
</tr>
<tr>
<td></td>
<td>Meat</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fat</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Snacks*</td>
<td>Carbohydrate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starch/bread</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Milk</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
</tr>
<tr>
<td></td>
<td>Fruit</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Meat</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*Can be used afternoon or evening (HS).
Tables or Charts Method
Most healthcare providers such as medical clinics, weight loss centers, diabetic centers, and others use standard tables or charts that provide your daily caloric needs according to the standard variables such as race, age, sex, height, and physical activity.

Ideal Weights and Basal Energy Needs Method
For nearly four decades, health professionals have been using three fundamental assumptions based on available medical observation as a base of calculating daily caloric needs:

1. A table or chart has been developed to show the “ideal” or “desirable” weight of a man or a woman.
2. A person’s basal energy needs are generally figured at 1 kcal/kg body weight/hr.
3. Three levels of caloric expenditure have been developed for three levels of physical activity.

An example is described below for calculating the daily caloric need of an adult patient:

Patient’s desirable weight (DW) = DW kg
Caloric need for sedentary patient = DW kg × 20–25 kcal/kg
Caloric need for patient with light activity = DW kg × 30 kcal/kg
Caloric need for patient with strenuous activity = DW kg × 35 kcal/kg

Special considerations are made for other groups: childhood, adolescence, elderly, with adjustment made if the person is overweight or underweight. As a result of new scientific studies, this method is not as popular as it once was.

Individualized Method
Scientifically, the most sophisticated method of calculating daily caloric needs uses many equations that cover several variables: race, age, sex, height, body mass index, and physical activity. This method is used mainly by large medical and research centers and applies to all age groups.

However, for children and adolescents, the following individualized method is applicable and used frequently (for children, common estimates are based on age and sex):

- Up to 1 year: 120 kcal/kg of body weight
- 1–10 years: 100–80 kcal/kg (declines as age increases)

Adolescence:
- Male
  - 11–15 years: average, 65 kcal/kg body weight
  - 6–20 years: average, 50 kcal/kg (high activity)
  - 40 kcal/kg (light activity)
  - 30 kcal/kg (sedentary)
- Female
  - 11–15 years: average, 35 kcal/kg body weight
  - 16–up years: average, 30 kcal/kg body weight

However, of all methods mentioned previously, tables and charts are used by most clinics and healthcare providers. After the patient’s daily caloric need is determined, the physician (or diettian) will prescribe the percentage of these calories from carbohydrate, protein, and fat, respectively. Then the permitted grams of these three nutrients can be calculated.

NUTRIENT DISTRIBUTION
When the daily amounts of protein, carbohydrate, and fat have been determined, they are converted into food servings and spread throughout the day into three meals and from one to three snacks, depending on the need for insulin injection, oral drugs, activity, or a combination of these. Large amounts of food, especially carbohydrates, should be avoided at any one time. A balance of meals throughout the day provides better control. The diabetic person should have regular meal hours to avoid fluctuations in blood glucose.

FOOD EXCHANGE LISTS
The exchange system of dietary control is widely used to manage the diet of a diabetic patient. This system permits flexibility in planning and preparation and allows measuring instead of weighing. It also offers a variety of food choices. However, the student will recognize, after studying the exchange lists, that it is not a suitable guide for planning meals for some ethnic groups or in all clinical situations. People from diverse cultural backgrounds may need nutrition counseling. Many times the illiterate or confused client will not understand the exchanges as written. Some clients have vision and/or hearing impairments. At such a time, students may wish to research the particular foods needed in order to individualize the diet or to simplify it. The dietitian in a nearby healthcare facility can be an excellent source for additional information, and can assist in designing appropriate diet instructions.

The exchange system provides equivalent food value for each food within a list; for example:

- Starch list: B vitamins, iron, protein, and carbohydrate
- Meat list: iron, zinc, B12, protein, and varying fat contents
- Milk list: carbohydrate, protein, varying fat contents, folacin and other vitamins from the B complex, vitamins A and D, and minerals
- Vegetable list: vitamins A, E, C, and K; B complex; fiber; protein; and carbohydrate
- Fruit list: vitamins, minerals, carbohydrate, and fiber

(Refer to Appendix F for the exchange lists.)
CARING FOR A DIABETIC CHILD

Caring for a diabetic child requires many special considerations, some of which are listed below:

1. Disease characteristics:
   a. The patient may be normal or underweight.
   b. Disease onset is abrupt and increases in severity during growth periods.
   c. Pancreatic cells cannot make insulin, and a diabetic child is insulin dependent.
   d. As the patient grows older, the requirement for insulin increases.

2. Dietary treatment goals:
   a. To permit normal growth and activity
   b. To control the disease
   c. To permit a normal school and social life with minimal restriction in freedom of movement and food choices
   d. To correspond with the action of insulin treatment. To achieve the above goals, the diet must recognize the child's food preferences and differ little from that of the patient's peers. Also, the child must be provided adequate food to permit normal development and activities.

3. Diet prescription and meal planning
   a. 75–90 kcal/kg of the child's ideal weight.
   b. 3.3 to 2.2 g of protein per kg body weight, with decreasing amount for increasing age.
   c. 50% of total calories from complex carbohydrate, 20% from protein, and 30% from fat.
   d. Three meals and three snacks daily usually, with other meal patterns determined by patient's clinical condition, amount of insulin needed, daily activities, and other factors.
   e. Meal plan coordinated with activities—sweets and extra fluids for strenuous and prolonged activities, eating a prescribed snack just before an exercise.

4. Patient compliance and education
   a. A young diabetic will accept a diet if it is not too different from that of his or her peers, and if it permits the child freedom in school and play.
   b. The patient should learn how to use the exchange lists for fast foods, which is included in the patient's booklets for meal planning. This permits the child to eat fast foods with his or her friends without deviating from the dietary prescription.

INSULIN PREPARATIONS, ORAL HYPOGLYCEMIC AGENTS (OHAS OR DIABETES PILLS), AND NEW DRUG THERAPY

Diet therapy must be coordinated with the patient's use of insulin or oral agent as prescribed by the attending physician. A pharmacist can help to interpret Tables 18-3 and 18-4 for the patient, and the specific medication that the patient has been prescribed should be emphasized.

The RN should:

1. Reinforce the pharmacist's teaching and help patients to understand the medication used to help control their diabetes. Interpret and explain these tables to the patient if no pharmacist is available.
2. Teach patients to use insulin or diabetic pills properly according to their prescription.
3. Coordinate meal and snack times with the prescribed medication.

Insulin Preparations

There are more than 20 types of insulin products available in four basic forms, each with a different time of onset and duration of action. The decision as to which insulin to choose is based on an individual's lifestyle, a physician's preference and experience, and the person's blood sugar level. Among the criteria considered in choosing insulin are:

- How soon it starts working (onset)
- When it works the hardest (peak time)
- How long it lasts in the body (duration)

Since 1982, most of the newly approved insulin preparations have been produced by inserting portions of DNA ("recombinant DNA") into special lab-cultivated bacteria or yeast. This process allows the bacteria or yeast cells to produce complete human insulin. Recombinant human insulin has, for the most part, replaced animal-derived insulin, such as pork and beef insulin. More recently, insulin products called "insulin analogs" have been produced so that the structure differs slightly from human insulin (by one or two amino acids) to change onset and peak of action. Table 18-3 lists some of the more common insulin preparations available today. Onset, peak, and duration of action are approximate for each insulin product, as there may be variability depending on each individual, the injection site, and the individual's exercise program.

Insulin Delivery Devices

All insulin delivery devices inject insulin through the skin and into the fatty tissue below. Most people inject the insulin with a syringe that delivers insulin just under the skin. Others use insulin pens, jet injectors, or insulin pumps. Several new approaches for taking insulin are under development.

Syringes

Syringes are hypodermic needles attached to hollow barrels that people with diabetes use to inject insulin. Insulin syringes are small with very sharp points. Most have a special coating to help the needles enter the skin as pain-
lessly as possible. Insulin syringes come in several different sizes to match insulin strength and dosage.

**Insulin Pens**

Insulin pens look like pens with cartridges, but the cartridges are filled with insulin rather than ink. They can be used instead of needles for giving insulin injections. Some pens use replaceable cartridges of insulin; other models are totally disposable after the prefilled cartridge is empty. A fine, short needle, like the needle on an insulin syringe, is on the tip of the pen. Users turn a dial to select the desired dose of insulin and press a plunger on the end to deliver the insulin just under the skin.

**Jet Injectors**

Insulin jet injectors may be an option for people who do not want to use needles. These devices use high-pressure air to send a fine spray of insulin through the skin. Jet injectors have no needles.

**Table 18-3 Insulin Preparations**

<table>
<thead>
<tr>
<th>Type of Insulin</th>
<th>Examples</th>
<th>Onset of Action</th>
<th>Peak of Action</th>
<th>Duration of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid-acting</td>
<td>Humalog (lispro)</td>
<td>15 minutes</td>
<td>30–90 minutes</td>
<td>3–5 hours</td>
</tr>
<tr>
<td></td>
<td>Eli Lilly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NovoLog (aspart)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Novo Nordisk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-acting (Regular)</td>
<td>Humulin R</td>
<td>30–60 minutes</td>
<td>50–120 minutes</td>
<td>5–8 hours</td>
</tr>
<tr>
<td></td>
<td>Eli Lilly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Novolin R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Novo Nordisk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate-acting (NPH)</td>
<td>Humulin N</td>
<td>1–3 hours</td>
<td>8 hours</td>
<td>20 hours</td>
</tr>
<tr>
<td></td>
<td>Eli Lilly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humulin L</td>
<td>1–2.5 hours</td>
<td>7–15 hours</td>
<td>18–24 hours</td>
</tr>
<tr>
<td>Intermediate- and short-acting</td>
<td>Humulin 50/50</td>
<td>The onset, peak,</td>
<td>The onset, peak,</td>
<td>The onset, peak,</td>
</tr>
<tr>
<td>mixtures</td>
<td>Humulin 70/30</td>
<td>and duration of action would reflect a</td>
<td>and duration of action would reflect a</td>
<td>of action would reflect a</td>
</tr>
<tr>
<td></td>
<td>Humalog Mix 75/25</td>
<td>composit of the</td>
<td>composit of the</td>
<td>composit of the</td>
</tr>
<tr>
<td></td>
<td>Humalog Mix 50/50</td>
<td>intermediate</td>
<td>intermediate</td>
<td>intermediate</td>
</tr>
<tr>
<td></td>
<td>Eli Lilly</td>
<td>1–3 hours</td>
<td>8–12 hours</td>
<td>36 hours</td>
</tr>
<tr>
<td></td>
<td>Novolin 70/30</td>
<td>1 hour</td>
<td>none</td>
<td>24 hours</td>
</tr>
<tr>
<td>Long-acting</td>
<td>Ultralente</td>
<td>4–8 hours</td>
<td>8–12 hours</td>
<td>36 hours</td>
</tr>
<tr>
<td></td>
<td>Eli Lilly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lantus (glargine)</td>
<td>1 hour</td>
<td>none</td>
<td>24 hours</td>
</tr>
<tr>
<td></td>
<td>Aventis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. Food and Drug Administration

**Insulin Pumps**

Insulin pumps are small pumping devices worn outside of your body. They connect by flexible tubing to a catheter that is located under the skin of your abdomen. The following recommendations are for a diabetic who likes to use this device:

- Program the pump to dispense the necessary amount of insulin.
- Usually, set the pump to give a steady small dose of insulin, but you can give an additional amount in a short time if needed, such as after a meal.
- If adjusted properly, these pumps allow close control of your insulin levels without multiple injections.
- Do not use this type of pump during physical activities that may damage the pump or disrupt the pump’s connection to the body.
- You still need to monitor your blood glucose levels regularly if you use this type of device.
Oral Hypoglycemic Agents (OHAs or Diabetic Pills)

Insulin is produced by the beta cells in the islets of Langerhans in the pancreas. When glucose enters the blood, the pancreas should automatically produce the right amount of insulin to move glucose into the cells. People with type 2 diabetes either produce too little insulin, produce it too late to match the rise in blood glucose, or do not respond correctly to the insulin that is produced. Then glucose builds up in the blood, overflows into the urine, and passes out of the body. This means that the body loses its main source of energy even though the blood contains large amounts of glucose.

Diabetes pills work in one of three ways. They either stimulate the pancreas to release more insulin, increase the body’s sensitivity to the insulin that is already present, or slow the breakdown of foods (especially starches) into glucose.

There are six categories of diabetes pills: sulfonylureas, meglitinides, nateglinides, biguanide thiazolidinediones, and alpha-glucose inhibitors. These are shown in Table 18-4.

New Drug Therapy

In 2006, the FDA approved the first ever inhaled insulin, Exubera, an inhaled powder form of recombinant human insulin for the treatment of adult patients with type 1 and type 2 diabetes. It is the first new insulin delivery option introduced since the discovery of insulin in the 1920s. This is a new, potential alternative for many of the more than 5 million Americans who take insulin injections.

NURSING IMPLICATIONS

Since diabetes is a lifelong disease, the client needs to learn to take responsibility for self-care. To promote this outcome requires extensive education.

Congress passed legislation allowing medical nutrition therapy (MNT) services to be compensated by insurance companies after the cost-effectiveness of such therapy was demonstrated. The registered dietitian (RD) is designated to be the primary teacher, but the nurse has a major role in the teaching process. In fact, diabetes education centers employ many RNs as well as RDs for teaching classes that help patients understand and control their disease (Certified Diabetes Educators). Nurses are part of a teaching team; therefore, they must be able to teach as well as reinforce the information that all diabetic clients need. The topics covered should include the following:

1. Explanation of the disease and why the diet will help the client control it
2. Principles of managing the diet:

<table>
<thead>
<tr>
<th>Table 18-4 Oral Antidiabetes Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Sulfonylurea</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Meglitinide</td>
</tr>
<tr>
<td>Nateglinide</td>
</tr>
<tr>
<td>Biguanide</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Thiazolidinedione (Glitazone)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Alpha-Glucose Inhibitor</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. Food and Drug Administration
a. Basic nutrition needs
b. Meal planning following the individual prescription
c. Menu planning that allows variety in the diet
d. Purchase and preparation practices appropriate to the diet therapy
e. Adjustments for illness or unusual activity, especially strenuous exercise
f. Diabetic foods
   • Diabetic foods are different from dietetic foods. The first group is either sugar-free or reduced in sugar content. The second refers to foods reduced in sugar, sodium, protein, or some other nutrients.
   • Diabetic foods are recommended for some but not all patients. Regular foods suitable for everyone are usually recommended, with only a few exceptions.
g. A relative or caretaker who can assist with meal planning should be present during patient education.
h. The patient should be provided with as much information as possible. Some examples include:
   • Food exchange lists
   • Diet plans, written or in picture form
   • Scheduled meal times and frequency
   • List of recommended cookbooks
   • Audio cassettes (if client is vision impaired)
   The patient's level of reading and comprehension must be considered, as well as any physical limitations. Diabetic patients required to restrict sodium intake must be taught basic knowledge of the sodium content of foods.
i. Some over-the-counter, prescription, or illicit drugs interfere with glucose test results. For example, experience has confirmed that prolonged excess vitamin C intake can lead to a false urinary glucose test.

3. How to monitor blood and urine, why it is needed, and how to keep good records
4. How to inject insulin: dosage, type, site rotation, and why timing of meals to insulin schedule is important
5. How to recognize symptoms of hypoglycemia or hyperglycemia and what to do about them
6. Why an exercise program is adjunct to diet therapy
7. Complications of uncontrolled diabetes, especially atherosclerosis, which is 25% higher in the diabetic population than in the nondiabetic population
8. Special dietary measures to prevent or delay onset of atherosclerosis: reduced fat intake, increased fiber intake
9. Dietary teaching begins with diagnosis or hospital admission, and not after discharge.

Since any comprehensive and successful diabetes management program must always include patient education, some special guidelines to assist in teaching follow.

**Patient Education**
A diabetic person may become ill from causes such as infection, trauma, and so on. Patients with a short-term illness should follow the guidelines indicated in Exhibit 18-1.

The patient is the most important member of the healthcare team. His or her participation and cooperation must be gained.

**Who to Teach and How**
1. Teaching one patient instead of a group of patients is more useful to the patient, although it is more costly in time and money.
2. If group education is used, patients should be sorted by their type of diabetes (e.g., young and insulin-dependent diabetics, obese patients using OHAs, and patients who are maintaining by diet alone). This sorting reduces confusion in the teaching process. If feasible, the use of both individualized and group education is ideal.
3. The benefits and limitations of using paraprofessionals to teach the patient should be considered.
4. The patient's history should be studied, especially the type of diet instructions he or she has previously received. Any information presented that seems to conflict with previous instructions should be explained to a patient's satisfaction.
5. At least one close relative or the patient's caretaker should be familiar with the information presented to the patient and should be present for the teaching sessions.

Some teaching aids and counseling services for diabetic persons include:
- Local, city, and county diabetic programs and support groups
- Private and public diabetic (clinical) centers
- Professional sources of materials include drug companies, American Dietetic Association, American Diabetes Association, state health agencies, diabetes educators
- Food models, films, and slides
- Ethnic teaching materials
- Demonstration kitchens and demonstration food portion sizes
- Recipes and cookbooks

Evaluation and follow-up teaching by the nurse or a clinical nutrition specialist should be scheduled.
CHAPTER 18  DIET THERAPY FOR DIABETES MELLITUS

PROGRESS CHECK ON ACTIVITY 1

With the use of the exchange lists in Appendix F, complete the following:

1. Fill out Exercise 18-1 for a calculated diet for diabetes mellitus.

MULTIPLE CHOICE

Circle the letter of the correct answer.

2. Which of the following foods is not a member of any of the meat exchange groups?
   a. ½ c pinto beans
      b. soy milk, 1 c

Exercise 18-1

Complete the chart by filling in the information for each column.

<table>
<thead>
<tr>
<th>Diet</th>
<th>Disease or Condition</th>
<th>Foods Allowed</th>
<th>Foods Limited</th>
<th>Foods Forbidden</th>
<th>Nursing Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculated</td>
<td>Diabetes Mellitus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Which of the following statements correctly describes the action of insulin?
   a. Insulin controls the entry of glucose into the cell.
   b. Insulin regulates the conversion of glucose to glycogen.
   c. Insulin decreases the conversion of glucose to fat for storage as adipose fat tissue.
   d. Insulin allows fat to be converted to glucose as needed to return the blood glucose levels to normal.

4. The caloric value of a diabetic diet should be:
   a. increased above normal requirements to meet the increased metabolic demand.
   b. decreased below normal requirements to prevent glucose formation.
   c. the individual's normal energy requirement to maintain ideal weight.
   d. contributed mainly by fat to spare carbohydrate.

5. In the exchange system of diet control, an ounce of canned tuna may be exchanged for all except:
   a. the same amount of lean meat.
   b. ⅛ c 4% cottage cheese.
   c. ¼ c tofu, light.
   d. one egg.

6. The exchange system of diet control is based on principles of:
   a. equivalent food values.
   b. flexible food choices.
   c. nutritional balance.
   d. all of the above.

7. How much orange juice would substitute for the CHO in an uneaten slice of bread?
   a. ⅛ c
   b. ¼ c
   c. 1 c
   d. 1–⅜ c

8. The diabetic diet is designed for long-term use and contains a balance of:
   a. energy.
   b. nutrients.
   c. distribution.
   d. all of the above.

9. Sources of blood glucose include:
   a. carbohydrates.
   b. proteins.
   c. fats.
   d. all of the above.

10. If 50% of the total calories in a 1500 calorie diabetic diet is from carbohydrates, how many grams of carbohydrate will the diet contain? (Round to nearest whole number.)
    a. 50
    b. 150
    c. 190
    d. 210

11. Emphasis is placed on using polyunsaturated fats and limiting foods high in cholesterol in the diet of the diabetic. The reason for this is:
    a. to aid in the prevention of cardiovascular diseases.
    b. to aid in the digestive process.
    c. to prevent skin breakdown.
    d. to control blood sugar.

12. The daily intake of foods for the diabetic is spaced at regular intervals throughout the day. The reason for this is:
    a. to prevent hunger pangs.
    b. to avoid symptoms of hypoglycemia or hyperglycemia.
    c. to modify eating habits.
    d. to prevent obesity.

13. Sally, an 8-year-old diabetic, is ready to go home from the hospital. Sally's mother should know that:
    a. all of her food must be measured.
    b. she needs a snack before she exercises.
    c. she should always carry hard candy with her.
    d. all of the above.

TRUE/FALSE
Circle T for True and F for False.

14. T  F The majority of adult-onset diabetics are underweight at the time the disease is discovered.

15. T  F A diabetic diet is a combination of specific special foods that cannot be changed.

16. T  F Diabetics should follow a low carbohydrate diet of about 50 g a day.

17. T  F A medium-size fresh peach contains 10 g carbohydrate and 40 calories.

18. T  F Insulin preparations now available are produced by recombinant DNA.

19. T  F Insulin analogs differ from regular insulin in their onset and peak action.

20. T  F Insulin is used to metabolize sugar in the body.
A diabetic patient in the hospital received insulin in the morning and ate breakfast, but was nauseated at lunch and could not eat. Circle T for the appropriate nursing interventions for this situation and F for the inappropriate ones.

21. T F Remove the lunch tray and tell the patient to let you know when he feels like eating.
22. T F Relieve the nausea by appropriate means.
23. T F Remove the lunch tray, asking the meal preparers to substitute liquids of equal value for the carbohydrate foods on the tray.
24. T F After you observe that the patient is better, offer him or her the liquids you ordered.

MATCHING
Match the foods in the left column with their nutrient values in the right column.

25. 1 slice bacon a. 12 g carbohydrate, 8 g protein, 5 g fat
26. 2 tbsp peanut butter b. 15 g carbohydrate, 3 g protein
27. ½ c oatmeal c. 5 g carbohydrate, 2 g protein
28. ½ c beets d. 7 g protein, 5 g fat
29. ½ c tofu e. 5 g fat

30. List five nursing implications for dietary care of a diabetic patient.
   a. 
   b. 
   c. 
   d. 
   e. 

31. Describe 5 of the 10 essential factors that a diabetic patient must know to control his or her disease.
   a. 
   b. 
   c. 
   d. 
   e. 

FILL-IN
32. Calculate the carbohydrate, protein, and fat value of the following day's allowance:

<table>
<thead>
<tr>
<th>Carbohydrate</th>
<th>Protein</th>
<th>Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk (2%), 2 exchanges</td>
<td>12 g</td>
<td>8 g</td>
</tr>
<tr>
<td>Vegetables, 3 exchanges</td>
<td>15 g</td>
<td>3 g</td>
</tr>
<tr>
<td>Fruit, 3 exchanges</td>
<td>5 g</td>
<td>2 g</td>
</tr>
<tr>
<td>Lean meat, 6 exchanges</td>
<td>7 g</td>
<td>5 g</td>
</tr>
<tr>
<td>Medium fat meat, 2 exchanges</td>
<td>5 g</td>
<td></td>
</tr>
<tr>
<td>Fat, 5 exchanges</td>
<td>5 g</td>
<td></td>
</tr>
<tr>
<td>Bread, 6 exchanges</td>
<td>5 g</td>
<td></td>
</tr>
</tbody>
</table>

33. Arrange the allowances in Question 32 into a day's menu:

BREAKFAST

LUNCH

DINNER

SNACK

MULTIPLE CHOICE
Circle the letter of the correct answer.

34. The caloric value of the diet in Question 32 is approximately:
   a. 1250 calories.
   b. 1500 calories
c. 1600 calories.
d. 1850 calories.

35. An intake reduction of 1000 calories daily would enable an obese person to lose weight at which of the following rates:
   a. 1 lb per week
   b. 2 lb per week
c. 3 lb per week
d. 4 lb per week

36. Which two of the following food portions have the lowest caloric values:
   a. 4 oz lean meat
   b. 1 granola bar
c. 1 slice raisin bread
d. 1 8-oz glass of whole milk

SHORT ANSWERS
37. People with type II diabetes usually have one of the following conditions:
   a. 
   b. 
   c. 
38. The three criteria that should be considered in choosing insulin are:
   a. 
   b. 
   c. 

39. The four basic types of insulin products are:
   a. 
   b. 
   c. 
   d. 

40. The three ways diabetes pills work in the body are:
   a. 
   b. 
   c. 

REFERENCES

CHAPTER 19

Diet and Disorders of the Liver, Gallbladder, and Pancreas

Time for completion
Activities: 1 hour
Optional examination: ½ hour

Objectives
Upon completion of this chapter, the student should be able to do the following:

1. Describe the major functions of the normal liver.
2. Identify the appropriate diet therapy for treating liver diseases and state the rationale for its use in treating hepatitis, cirrhosis, hepatic coma and liver failure, and cancer.
3. Describe the diet therapy used for liver transplantation.
4. Evaluate nursing interventions to promote optimal nutrition in a patient with liver disease.
5. Discuss the causes of gallbladder and pancreatic disorders, and describe how they affect food metabolism.
6. Identify the sequence of physiological events in which bile assists in the absorption and metabolism of foods.
7. Differentiate among cholecystitis, cholelithiasis, and cholecystectomy in relation to their effects on the digestion and metabolism of foods.
8. Describe and give examples of the diet therapy used for gallbladder disease.
9. Identify the major causes of pancreatitis.
10. Relate the association between pancreatitis and gallbladder disease.
11. Describe the diet therapy for pancreatitis and the reasons for its use.
12. Discuss appropriate nursing interventions for patients with gallbladder disease or pancreatitis.

Glossary

Ascites: abnormal accumulation of serous fluid within the peritoneal cavity (the space between the abdominal walls and the pelvic cavity).
Calculus ("stones"): an abnormal concretion, usually of mineral salts, occurring in the body in hollow organs or passages.
Cholecystectomy: removal of the gallbladder by surgical procedure.
Cholecystitis: inflammation of the gallbladder, acute or chronic.
Cholecystokinin: a hormone secreted in the small intestine that stimulates gallbladder contraction and secretion of pancreatic enzymes.
Cholelithiasis: calculi in the common bile duct.
Cholesterol: a steroid alcohol found in animal fats, bile, blood, brain tissue, whole milk, egg yolk, liver, kidneys, adrenal gland, and the myelin sheath of nerve fibers.
Edema: abnormal accumulation of fluid in the intercellular spaces of the body.
Emulsify: to mix together two immiscible liquids. One is dispersed into the other in small drops.
Encephalopathy: any chronic degenerative disease of the brain.
Esophageal varices: varicose veins in the esophagus that occur most often as a result of obstruction of the portal circulation.
Fulminant: sudden, severe; occurring suddenly with great intensity.
Gallbladder (GB): the pear-shaped organ located below the liver which serves as a storage place for bile.
Hepatic: pertaining to the liver.
Hepatitis virus classification:
- Hepatitis A virus (HAV), previously called infectious hepatitis, is spread by the oral-fecal route from an infected person through contaminated water and food. Although it is a very serious disease it does not cause chronic hepatitis or cirrhosis. A recent vaccine, better than gamma globulin, is now on the market.
- Hepatitis B virus (HBV), formerly called serum hepatitis, is classified as a sexually transmitted disease (STD) because it is spread via body fluids, semen, saliva, tears, and by needle-sharing among drug users. It is a major factor in chronic liver disease and liver cancer. It can persist a lifetime in body fluids. Up to 75% of carriers are Asian.
- Hepatitis C virus (HCV) is associated with chronic active hepatitis, liver cirrhosis, and liver cancer.
- Hepatitis D virus (HDV), previously called non-A, non-B, is toxic to functional liver cells and may be related to the onset of HAV and HBV.
- Hepatitis E virus (HEV), the newest of the discovered viral liver diseases, has a mortality rate of 80%–90%. It may be due to toxic liver injury such as with carbon tetrachloride or acetaminophen overdose. Pregnant women who contract HEV, usually in the third trimester, die of fulminant liver failure.
Jaundice: yellowness of the skin, mucous membranes, and excretions (jaundice is not a disease, but is a symptom of numerous disorders of the liver, gallbladder, and blood; it occurs when pigment in the blood is destroyed).
Marasmus: protein-calorie malnutrition, causing growth retardation and wasting of muscle.
Pancreas: a large elongated gland located transversely behind the stomach between the spleen and duodenum.
Portal (circulation): circulation of blood through layer vessels from the capillaries of one organ to those of another (applies here especially to passage of blood from the GI tract and spleen through the portal vein to the liver).
Psychotropic: capable of modifying mental activity; a drug that affects the mental state.

Background Information

Liver

A normal liver regulates the proper digestion, metabolism, and absorption of food. The following is an outline of the liver’s major functions:

1. Storage—The liver stores:
   a. Approximately 1 lb of glycogen, the body’s emergency energy supply; this supply lasts 12 to 36 hours when used as the only energy source.
   b. More fat-soluble than water-soluble vitamins
   c. More iron than any other part of the body
2. Circulation—The liver regulates:
   a. Blood volume
   b. Blood transfer from the portal to systemic circulation
   c. Fluid transfers
3. Metabolism—The liver participates in:
   a. Carbohydrate metabolism by interconverting glucose and glycogen as needed; it also converts amino acids to glucose in the presence of excess protein or low carbohydrate level
   b. Fat metabolism by providing bile salts for emulsifying fat, cholesterol, and lipoproteins and by converting excess amino acid and carbohydrate to fats
   c. Protein metabolism by forming plasma proteins, prothrombin, and urea
planning nutritional care for patients with pancreatitis.

The pancreas may become inflamed and/or obstructed by chronic alcohol abuse or GB disease. Food eaten during these conditions becomes the source of excruciating pain, and the client will avoid eating. Consequently, the person’s nutritional status is very poor. Determining the type of pancreatic disorder is of major importance when planning nutritional care for patients with pancreatitis.

Gallbladder and Pancreas

The gallbladder (GB) is an accessory organ to the gastrointestinal (GI) tract. The emulsification of fats by bile salts from the GB is an important contribution to the overall efficiency of GI functioning. Gallbladder disease is a common but potentially serious disorder. The most common disorder is cholelithiasis, or formation of gallstones. It develops in 10%–20% of the Western world’s population. Nearly 80%–90% of gallstones are composed primarily of cholesterol.

Some population groups are more susceptible to GB disease, such as older men and women, and especially women who have borne children. Others include Native Americans and individuals using oral contraceptives and drugs that lower blood cholesterol levels. Heredity appears to have a major influence in the development of gallstones. Diet plays a role, but a minor one. For example, excess use of polyunsaturated fats can increase the incidence of GB disease.

Other contributing factors include obesity and intestinal diseases that involve the malabsorption of bile salts. Occasionally, the stress of pregnancy is responsible. Populations with a low intake of total fat appear to be less vulnerable to cholelithiasis.

Medical management of GB disease includes temporary use of drugs to dissolve the stones, and surgery if the patient is not undernourished or obese. An undernourished patient can be replenished, while an obese one can lose weight. The actual surgery (cholecystectomy) has less nutritional implication than believed previously. The procedure allows bile to enter the small intestine on a continuous basis. With time, the bile ducts may enlarge and store bile. Because of this adaptation, many clients resume a normal diet one to two months after surgery.

Because the pancreas is an important accessory organ of the GI tract and a major producer of digestive enzymes, any pancreatic disorder can seriously impair the body’s ability to digest food. Reduced production of pancreatic enzymes may occur in cystic fibrosis, chronic pancreatitis, pancreatic cancer, or protein-calorie malnutrition. The pancreas may become inflamed and/or obstructed by chronic alcohol abuse or GB disease. Food eaten during these conditions becomes the source of excruciating pain, and the client will avoid eating. Consequently, the person’s nutritional status is very poor. Determining the type of pancreatic disorder is of major importance when planning nutritional care for patients with pancreatitis.

ACTIVITY 1:

Diet Therapy for Diseases of the Liver

Diet Therapy for Hepatitis

Viral hepatitis, inflammation of the liver, is a major world health problem, causing the illness and death of millions of people. Currently scientists have discovered five types of hepatitis. They are described in the glossary. Even though they are unrelated in function, the goal of medical management and diet therapy for hepatitis of any type is to promote liver tissue healing.

Medical management for hepatitis includes (a) optimum nutrition for healing, (b) complete bed rest to reduce inflammation and metabolism, and (c) alcohol and all other drugs are prohibited to avoid further liver damage. Diet therapy appropriate for hepatitis includes the following considerations:

1. Protein: 1.2–1.5 g/kg body weight per day
2. Carbohydrate: no carbohydrate restriction; however, serum glucose should be monitored as hyper- and hypoglycemia can result from liver dysfunction.
3. Fat: 30% of calories, with restrictions only indicated with maldigestion due to reduced synthesis and secretions of bile acids
4. Energy (Calories): 25–35 kcal/kg body weight per day
5. A multivitamin mineral supplement at 100% of the RDAs/DRIs may be necessary.
6. Fluids and sodium restriction may be necessary if edema or ascites is present.
7. If adequate nutrition cannot be maintained by oral feedings, enteral feedings or TPN may be indicated.

Table 19-1 presents a sample menu for a high-carbohydrate, high-protein, high-vitamin, and moderate-fat diet. Food may need to be liquid at first; concentrated formulas can be used that contain a modified fat content, as tolerated by the patient.

Diet Therapy for Cirrhosis

Cirrhosis is the final stage of certain liver injuries, including alcoholism, untreated hepatitis, biliary obstruction, and drug and poison ingestion. Malnutrition, chronic active hepatitis, and excessive intake of vitamin A for a prolonged time also induce cirrhosis. In fact, cited cases of vitamin A overdose that produced cirrhosis, and ultimately death, report doses ranging from 25,000 IU to 100,000 IU taken continuously for two to six years. The persons believed they were improving their health. The liver is unable to generate new cells, which are replaced with fibrous, nonfunctioning tissue.

Stages of Cirrhosis

Cirrhosis has early and late stages. The early stages affect the digestive system and cause such symptoms as nausea,
vomiting, distention, diarrhea, and anorexia. These symptoms are managed by a dietary plan similar to that for hepatitis. The rationale also is the same: to support residual liver function and prevent further cell destruction. Compliance with dietary and other medical recommendations will delay development of the late stages of the disease for years for some patients.

In the later stages of cirrhosis, the patient is severely malnourished. Edema, ascites, anemia, infections, intestinal bleeding, jaundice, and esophageal varices may be present. Renal failure also may occur. The patient is in critical condition. Primarily, a diet high in protein, carbohydrate, vitamins, and calories, and moderate in fat is preferred for advanced cirrhosis. However, other dietary changes are prescribed according to the patient’s condition:

1. Protein—If hepatic coma is not indicated, protein remains at 75 to 100 g daily. If, however, the patient shows signs of impending coma, the physician should reduce protein intake to lessen the chance of coma.
2. Sodium—Edema and/or ascites is counteracted by a 500 to 1000 mg sodium (daily) diet. Fluid intake may be limited. Refer to Chapter 16 for sodium-restricted diets.
3. Texture—Esophageal varices, if present, are managed by semisolid or liquid diets to avoid potential rupture and hemorrhage. Tube feedings are not advised for patients with this complication. These patients should avoid coffee, tea, pepper, chili powder, and other irritating seasonings.

For a patient with poor appetite, other measures are used to provide adequate nutrients and calories. These include oral formulas high in nutrients and calories; vitamin/mineral supplements; electrolyte replacements; hepatic aids; and parenteral feedings.

If the cirrhosis is alcohol induced, deficiency of magnesium and vitamin B complex is often present. Alcohol reduces vitamin absorption and increases mineral excretion.

HEPATIC ENCEPHALOPATHY (COMA)

Hepatic coma is caused by brain damage resulting from the inability of a damaged liver to metabolize ammonia compounds. Irritability, confusion, drowsiness, apathy, and irrational behavior precede the coma. Other signs are motor dysfunction and fecal breath odor. Ammonia is formed from protein in the intestines by bacterial action. The protein may be ingested or derived from blood (bleeding into the intestine). Treatment includes antibiotics, psychotropic drugs, enemas to remove blood and protein from the bowel, and diet therapy. Diet therapy in impending hepatic coma is as follows:

1. Protein intake is limited to 0 to 50 g daily, depending on the blood ammonia level. Note that dietary protein is derived chiefly from milk and meats and is of high biological value. It produces minimal ammonia because it is used optimally without waste; that is, it is not metabolized for energy. Supplemental branched chain amino acids (leucine, isoleucine, and valine) can be used as a source of protein for the heart, muscle, and brain, as well as for energy. They are not dependent on the liver but are metabolized by other body tissues.
2. The diet provides 1500 to 2000 calories per day, mainly derived from carbohydrates and fat. This reduces tissue breakdown and ammonia formation.
3. Vitamins are given intravenously; vitamin K is especially needed to reduce bleeding.
4. Fluid output is balanced by equal intake. Urine voided and other fluid lost are recorded.
5. TPN or enteral nutrition are also standard forms of diet therapy for liver failure.

CANCER OF THE LIVER

The diet for a patient with liver cancer is high in carbohydrate, protein, fluid, vitamins, and calories and moderate in fat. Alternate intervals of feeding (other than three meals a day) are indicated for all cancer patients, but especially when the liver is involved and the utilization of nutrients is compromised. The diet will be individualized to fit the patient’s tolerance. For instance, when cancer patients develop an aversion to meat, meat substitutes are offered to satisfy the high protein need.

The type of protein-calorie malnutrition that develops during advanced liver disease and hepatic cancer is severe and is accompanied by the many complications common to marasmus. The malnourishment only adds to other clinical problems, making the restoration and maintenance of optimum nutrition difficult.

All liver disorders present a challenge to the nurse to provide adequate nutrition for the patient.

LIVER TRANSPLANTS

Liver transplantation for patients with end-stage liver disease is now a standard operation, and survival rate is acceptable within the current medical care system.

Persons considered candidates for transplantation include those with progressive, irreversible liver disease whose chances for survival are less than 10% without a transplant and for whom conventional treatment has failed. Diagnosis in adult candidates for transplantation include biliary cirrhosis, chronic active hepatitis, and fulminant liver failure with encephalopathy. Common diagnosis in child candidates are biliary atresia or inborn errors of metabolism. Patients with alcoholic cirrhosis, hepatic malignancies, or advanced lung and kidney disease are not considered candidates because their chances of survival are poor.

In general, nutrition therapy for a post liver transplant patient has the following objectives:

- Hasten wound healing.
- Reduce or prevent infection.
- Increase metabolism to preserve lean body mass.
- Normalize hydration.
- Supply adequate energy to permit physical therapy.

Major nutrition support after transplant includes the following:

1. Determine appropriate weight for diet calculation. The weight measure can be achieved with proper procedure.
2. 30–35 calories per kg weight, taking into consideration fever, infection, or other complications
3. Assuming renal function is normal, a diet offering 1.2–2 g of protein per kg per day is recommended. Protein requirements are increased due to:
   - Immunosuppressive medications can result in muscle or fat breakdown.
   - Wound healing status.
4. Food preferences and selections can pose a problem. Extensive assistance from caregivers is essential. Advises on food variety such as type, taste, texture are important. Small and frequent meals are encouraged.
5. Most patients cannot achieve the recommended nutrients intake without dietary supplements, though some do not welcome such products or procedures.
6. Enteral or tube feedings may be necessary to supply recommended intakes of calories, protein, and other nutrients in order to assist the patient to reach an acceptable improvement in the overall health and oral consumption.

At all times, the patient is monitored closely for clinical improvement in the following:

- Healing of wounds
- Infection
- Physical activity
- Adjustment to all aspects of nutrition intervention

One can determine when to start an oral diet by using the following guides:

- An intact digestive system is confirmed.
- All tubes are removed from the digestive system.
- Ability to chew and swallow.

Most liver recipients will be able to start oral intake within the first 1–2 days after transplantation. However, initial feedings should be in small amounts to observe patient response.

Initial feedings follow standard postsurgical hospital dietary management: clear fluids to a regular diet as rapidly as tolerated. Other considerations such as use of supplements, restriction of a nutrient (sodium, fats, or carbohydrate) should be individualized by the care team and the attending dietitian.

The issue of food safety, especially the occurrence of pathogens in the food, must be closely monitored. All standard hospital routine practices of excluding microbial contamination must be implemented. Any patient with a liver transplant is a good candidate for infection.

However, as time progresses, accumulated experience will allow hospital dietitians to implement more appropriate nutrition interventions for the patient after the transplant.
NURSING IMPLICATIONS

Responsibilities of the nurse in treating cirrhosis are as follows:

Dietary Plans
1. The dietary plan for each patient should be individualized according to clinical conditions, appetite, and so on. For example, a patient with advanced cirrhosis may be very hungry in the morning, and a large breakfast should be provided.
2. Many patients with ascites prefer frequent, small meals to large ones, which can cause discomfort by raising portal pressure.
3. Any meal planning must consider gastrointestinal disorders such as diarrhea, nausea, vomiting, and anorexia. Such conditions interfere, both physically and psychologically, with eating.
4. Low-sodium milk is more acceptable if flavoring such as honey or vanilla is added.
5. Patients do not like most oral nutrition formulas with medium-chain triglycerides (MCT) added. Experience confirms better acceptance by some patients when the beverage is served chilled.
6. Work with the dietitian to devise ways to encourage optimal intake.

Patient Monitoring
1. A careful record of food intake is useful.
2. Be alert to signs of impending coma.
3. Always balance fluid intake and output.

Teamwork
1. Teamwork is mandatory. The team includes the nurse, physician, dietitian, patient, and family members.
2. Conferences and strategy sessions with members of the team ensure that the patient will be encouraged to eat.

Alcoholism and Drugs
1. The nurse should refrain from judging the patient’s drinking habits.
2. The patient should be provided with assistance, including such therapy as Alcoholics Anonymous meetings and rehabilitation centers.
3. The patient should be given intense education on the disease and its complications and treatment.
4. No alcoholic beverage is permitted in the hospital. Abstinence at home is strongly encouraged.
5. The patient should comply with specific usage for any prescription drugs and avoid all others.

Diet Therapy for Transplantation

Candidates need aggressive nutritional support such as is necessary in all major surgery. Thorough nutritional assessment before the surgery is necessary. Patients generally have poor nutritional status and may require enteral or parenteral nutrition before surgery for optimal postoperative results. These patients are given antibiotics before and after surgery to reduce bacterial development. A low-bacteria diet is also recommended before and after surgery.

The essentials of food-handling precautions for transplantation are as follows:
1. Avoid all fermented dairy products such as yogurts and cheeses.
2. Do not eat vegetables, including salads and garnishes, and fruits that are not peeled.
3. Defrost frozen foods in the refrigerator or microwave.
4. Do not use foods kept at room temperature or kept heated for long periods of time.
5. Serve and eat foods quickly following preparation.
6. Cover and freeze leftovers immediately.
7. Use refrigerated leftovers within two days.
8. Keep the preparation and serving area very clean.
9. Be sure that sanitary techniques are maintained throughout, and that food handlers are vigilant about personal habits and dress.

PROGRESS CHECK ON ACTIVITY 1

FILL-IN

Use a separate sheet of paper for your answers.

1. Fill in the sheet marked Exercise 19-1 for a high-carbohydrate, protein, and vitamin diet with moderate fat.
2. Plan a breakfast menu for a diet that is high in calories, carbohydrate, protein, and vitamins, and moderate in fat.
3. Alter this breakfast menu to meet the needs of a client who daily requires 40 g protein and 2 g sodium.
4. Mrs. J. is admitted to the hospital with a diagnosis of infectious hepatitis and is placed in isolation. Her diet prescription is 350 g carbohydrate, 100 g protein, and 100 g easily digested fat. She will receive a therapeutic dose vitamin supplement. Answer the following questions about her diet:
   a. What is the caloric value of her diet? ________
   b. Why were the extra calories ordered? ________
**Exercise 19-1 A practice on the dietary management of selected disorders and nursing implications**

Complete the chart by filling in the appropriate information for each column.

<table>
<thead>
<tr>
<th>Diet</th>
<th>Disease or Condition</th>
<th>Foods Allowed</th>
<th>Foods Limited</th>
<th>Foods Forbidden</th>
<th>Nursing Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-carbohydrate, protein, and vitamin;</td>
<td>Hepatitis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderate fat</td>
<td>Early cirrhosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Marasmus</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Uncomplicated postoperative convalescence</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

c. Compare the ordered protein intake with the RDAs/DRIs for an adult nonpregnant woman. (See Chapter 9.)

d. Why is the extra protein needed?

e. What is the role of the extra carbohydrate?

f. What is the rationale for the extra vitamins?

g. Which foods should be avoided?

h. If Mrs. J. develops ascites, what additional restrictions should be placed on her diet?

i. What precautions with the eating utensils will the nurse observe with this patient?

j. What other diseases require the diet prescribed for hepatitis?

5. List the nine guidelines used to instruct patients, caregivers, and dietary and nursing personnel regarding appropriate food-handling practices before and after a liver transplant.

a. 

b. 

c. 

d. 

e. 

f. 

g. 

h. 

i. 

ACTIVITY 2:

Diet Therapy for Diseases of the Gallbladder and Pancreas

The normal function of the gallbladder is to concentrate and store the bile derived from the liver. The liver produces 600 to 800 milliliters of bile per day, and the gallbladder concentrates and stores 40 to 70 milliliters. When fat enters the duodenum, it stimulates the secretion of a hormone, cholecystokinin, which is carried by the blood to the gallbladder. This hormone directs the gallbladder to contract, so that bile is released into the common duct and then travels to the duodenum. The function of bile is to emulsify fats so that they can be broken down or digested by fat-splitting enzymes, the lipases. Any interference with the flow of bile impairs fat digestion.

Because gallstones may enter the common bile duct and block the flow of the pancreatic juice and enzymes, pancreatitis is a common complication of gallbladder disease. Pancreatitis is a severe disorder, since the enzymes in the immobile juice can cause the pancreas to digest itself. Acute pain and tenderness result, and in critical cases the pancreas may hemorrhage. The treatment of choice is to inhibit the secretion of the enzymes and to treat for shock and renal shutdown. In this case, diet therapy is useful only after the crisis has subsided.

Another causative factor for pancreatitis, especially a chronic condition, is alcoholism. Irrespective of the cause of pancreatitis, dietary treatment and nursing implications are the same.

MAJOR DISORDERS OF THE GALLBLADDER

The two major disorders of the gallbladder are cholecystitis and cholelithiasis. Cholecystitis usually results from a low-grade chronic infection. The major component of bile is cholesterol. When the gallbladder mucosa becomes inflamed or infected, the cholesterol may precipitate, forming gallstones of almost pure cholesterol crystals. Cholelithiasis is an end result of cholecystitis, but a high-fat intake over a long period of time also predisposes to gallstone formation. The body will produce more cholesterol to make more bile to assist in the metabolism of fat.

Treatments and Therapy

Cholecystectomy is the surgical removal of the gallbladder. When a person with cholecystitis or cholelithiasis eats a meal, especially if fat content is high, the gallbladder contracts in response to cholecystokinin stimulation. This causes severe pain, fullness, distention, nausea, and vomiting. Surgery is usually the treatment of choice. However, surgery may be postponed for two reasons: until the inflammation subsides, or until the patient loses weight, if he or she is obese, which many are. In these cases, supportive therapy is largely dietary.

Two recent advances in the removal of gallstones that do not require surgery are being used for selected patients. One, called litholysis, involves the use of either oral doses or direct installation into the gallbladder of certain bile acids that dissolve the stones. The second method, a process called lithotripsy, uses either ultrasonic waves or laser beams to mechanically break the stones into tiny fragments that can then be eliminated.

These methods, and new ones still being developed, are being used successfully for many patients. However, not all patients are candidates for these procedures. Those who have other medical problems, such as people with chronic liver disease or women who are pregnant, are excluded. Additionally, these procedures work only when the stone size is small. Surgery will still be the choice of treatment for many patients.

Regardless of the type of treatment, a low-fat, high-fiber diet is recommended, with caloric reduction, prior to surgery or treatment, if weight loss is needed and the cholecystectomy is not an emergency. Table 19-2 provides a guide for choosing suitable foods, and Table 19-3 lists a sample menu using these foods although the caloric content will require further reduction if weight loss is an objective.

DIET THERAPY FOR GALLBLADDER DISEASE

Dietary fat is reduced to diminish gallbladder contraction, which is responsible for pain and associated symptoms. Fat modification involves only its quantity, approximately 40 to 50 g intake per day. Protein provides only 10%–12% of the daily calories, since most protein foods also contain fats. The remainder of the day's calories should be derived from carbohydrates.

If weight loss is indicated, calories will be reduced accordingly. Use of both the weight-reduction diets discussed in other chapters and the food exchange system is recommended. Caloric intake should not be less than 1200 calories per day. These diets are used only before surgery; otherwise, a patient can be placed on these diets after he or she has completely recovered from surgery. Another consideration is to provide such patients with vitamin K to reduce bleeding.

Restriction of foods that can cause abdominal discomfort, such as gas, is individualized and not implemented randomly.

Because the body manufactures its own cholesterol in amounts several times more than is present in the daily diet, restricting dietary cholesterol to reduce gallstone formation has been questioned. Since cholesterol is manufactured from fat in the diet, lowering total fat intake may prove more effective.

In addition to a comprehensive diet therapy for patients with gallbladder disorder, some suggestions will
### Table 19-2 Permitted and Prohibited Foods in a Fat-Restricted Diet

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods Permitted</th>
<th>Foods Prohibited</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Milk and milk products</strong></td>
<td>Skim milk (fortified with vitamins A and D): fluid, dry powder, and evaporated; yogurt and buttermilk made from skim milk (fortified with vitamins A and D). Whole milk and all products made from it; low-fat and 2-percent milk and all products made from them; heavy cream, half-and-half, sour cream; cream sauces, non-dairy cream substitutes.</td>
<td></td>
</tr>
<tr>
<td><strong>Breads and equivalents</strong></td>
<td>Enriched or whole-grain bread; plain buns and rolls; crackers; matzo, melba toast; other varieties not specifically excluded; all cereals that are tolerated by the patient; potatoes except those specifically excluded; rice (brown or white); spaghetti, noodles, macaroni; barley; grits; wild rice; flours (all varieties). Biscuits, dumplings, corn bread, waffles, pancakes, nut breads, doughnuts, spicy snack crackers, sweet rolls, popovers, French toast, corn chips, muffins, all items made with a large quantity of fat; cereals with nuts and 100 percent bran may be omitted if not well tolerated; fried potatoes, creamed potatoes, potato chips, hash-browned potatoes and potato salad, scalloped potatoes; fried rice, egg noodles, casseroles prepared with cream or cheese sauce; chow mein noodles, bread stuffing; Yorkshire pudding; Spanish rice; fritters; spaghetti with strongly seasoned sauce.</td>
<td></td>
</tr>
<tr>
<td><strong>Meats and equivalents</strong></td>
<td>Limited to 4 to 6 oz daily; all lean fresh meat, fish, or poultry (no skin) with fat trimmed; shellfish, salmon, and tuna canned in water; foods may be pan-broiled, broiled, baked, roasted, boiled, stewed, or simmered; soybeans, peas, and meat analogues if tolerated. Fried, creamed, breaded, or sauteed items; sausage, bacon, frankfurters, ham, luncheon meats, meats with gravy, many processed and canned meats; any seafood packed in oil; nuts, peanut butter, pork and beans.</td>
<td></td>
</tr>
<tr>
<td><strong>Cheese and eggs</strong></td>
<td>Any variety not specifically prohibited (2 oz cheese equivalent to 3 oz meat); 1 egg yolk a day, any style, with no fat used in cooking; egg whites may be used as desired; 1 egg yolk equals 1 oz meat. Any cheese made from whole milk, including cream cheese; any egg that is creamed, deviled, or fried.</td>
<td></td>
</tr>
<tr>
<td><strong>Beverages</strong></td>
<td>Most nonalcoholic beverages except those specifically excluded. All beverages containing chocolate, cream, or whole milk; for example, milk shakes and eggnog. Alcoholic beverages if not permitted by doctor.</td>
<td></td>
</tr>
<tr>
<td><strong>Fruits and vegetables</strong></td>
<td>All varieties not excluded and tolerated by the patient. Avocado and any not tolerated by the patient; fried and creamed vegetables, vegetables with cream sauces or fat added; any variety not tolerated.</td>
<td></td>
</tr>
<tr>
<td><strong>Soups</strong></td>
<td>Broth, bouillon, or consommé with no fat; fat-free soup stocks; all homemade soups or cream soups made with allowed ingredients; soups made with skim milk; clear soups with permitted vegetables and meats with fat skimmed off; packaged dehydrated soup varieties. Most commercial soups; any soup made with cream, fat, or whole milk.</td>
<td></td>
</tr>
<tr>
<td><strong>Fats</strong></td>
<td>Limited to 2 to 3 tsp per day; all fats and oils (e.g., margarine, butter, shortening, lard); heavy cream (1 tbsp = 1 tsp fat); sour cream or light cream (2 tbsp = 1 tsp fat); cream substitute (4 tsp = 1 tsp fat); salad dressing (1 tbsp = 1 tsp fat); low-calorie dressing in small amounts not counted in fat allowances. All fats exceeding the 2- to 3-tsp limit, including bacon drippings.</td>
<td></td>
</tr>
<tr>
<td><strong>Sweets</strong></td>
<td>Plain sweets, honey, syrup, sugar, molasses, jams, jellies, plain sugar candies, chewing gum, hard candy, marshmallows, gum drops, jelly beans, sour balls, preserves, marmalade, tutti-frutti. Any candies or sweets made with nuts, coconut, chocolate, cream, whole milk, margarine, butter.</td>
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</table>

(continues)
help to relieve certain symptoms of these patients. Table 19-4 summarizes the information.

**OBESITY, DIETING, AND GALLSTONES**

Obesity is a strong risk factor for gallstones, especially among women. People who are obese are more likely to have gallstones than people who are at a healthy weight. Body mass index (BMI) can be used to measure obesity in adults. BMI is calculated from this equation:

\[
\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (M)}^2}
\]

The table in Appendix A calculates BMI for you. A BMI of 18.5 to 24.9 refers to a healthy weight, a BMI of 25 to 29.9 refers to overweight, and a BMI of 30 or higher refers to obese. Also see Chapter 7.

As BMI increases, the risk for developing gallstones also rises. Studies have shown that risk may triple in women who have a BMI greater than 32 compared to those with a BMI of 24 to 25. Risk may increase sevenfold in women with a BMI greater than 45 compared to those with a BMI less than 24.

Researchers have found that people who are obese may produce high levels of cholesterol. This leads to the production of bile containing more cholesterol than it can dissolve. When this happens, gallstones can form. People who are obese may also have large gallbladders that do not empty normally or completely. Some studies have shown that men and women who carry fat around their midsections may be at a greater risk for developing gallstones than those who carry fat around their hips and thighs.

Weight-loss dieting increases the risk of developing gallstones. People who lose a large amount of weight quickly are at greater risk than those who lose weight more slowly. Rapid weight loss may also cause silent gallstones to become symptomatic. Studies have shown that people who lose more than 3 lb per week may have a greater risk of developing gallstones than those who lose weight at slower rates.
A very low-calorie diet (VLCD) allows a person who is obese to quickly lose a large amount of weight. VLCDs usually provide about 800 calories or less per day in food or liquid form, and are followed for 12 to 16 weeks under the supervision of a healthcare provider. Studies have shown that 10%–25% of people on a VLCD developed gallstones. These gallstones were usually silent; they did not produce any symptoms. About one third of the dieters who developed gallstones, however, did have symptoms, and some of these required gallbladder surgery. Experts believe dieting may cause a shift in the balance of bile salts and cholesterol in the gallbladder. The cholesterol level is increased, and the amount of bile salts is decreased. Following a diet too low in fat or going for long periods without eating (skipping breakfast, for example), a common practice among dieters, may also decrease gallbladder contractions. If the gallbladder does not contract often enough to empty out the bile, gallstones may form.

Weight cycling, or losing and regaining weight repeatedly, may increase the risk of developing gallstones. People who weight cycle, especially with losses and gains of more than 10 pounds, have a higher risk for gallstones than people who lose weight and maintain their weight loss. In addition, the more weight a person loses and regains during a cycle, the greater the risk of developing gallstones.

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Why weight cycling is a risk factor for gallstones is unclear. The rise in cholesterol levels during the weight loss phase of a weight cycle may be responsible.

Gallstones are common among people who undergo gastrointestinal surgery to lose weight, also called bariatric surgery. Gastrointestinal surgery to reduce the size of the stomach or bypass parts of the digestive system is a weight loss method for people who have a BMI above 40. Experts estimate that one third of patients who have bariatric surgery develop gallstones. The gallstones usually develop in the first few months after surgery and are symptomatic.

You can take several measures to decrease the risk of developing gallstones during weight loss. Losing weight gradually, instead of losing a large amount of weight quickly, lowers your risk. Experts recommend losing 1–2 lb per week. You can also decrease the risk of gallstones associated with weight cycling by aiming for a modest weight loss that you can maintain. Even a loss of 10% of body weight over a period of 6 months or more can improve the health of an adult who is overweight or obese.

Your food choices can also affect your gallstone risk. Experts recommend including some fat in your diet to stimulate gallbladder contracting and emptying. However, no more than 30% of your total calories should come from fat. Studies have also shown that diets high in fiber and calcium may reduce the risk of gallstone development. Finally, regular physical activity is related to a lower risk for gallstones.
2. As healing progresses, the first oral diet usually consists of clear liquid with amino acids, predigested fats, and other commercial preparations added gradually. The patient progresses to a bland diet given in six small feedings. No stimulants—coffee, caffeine, tea, colas, alcohol—are allowed.

DIET THERAPY FOR CHRONIC PANCREATITIS

The aim of diet therapy is to treat the malabsorption and prevent malnutrition. Diet therapy for chronic pancreatitis usually consists of a bland diet of soft or regular consistency in small meals at frequent intervals (six feedings), and contains no stimulant foods. Pancreatic enzymes are given orally with food. Alcohol is strictly forbidden.

1. Use a low-fat diet.
2. Vitamin and mineral supplementation may be necessary, especially fat-soluble vitamins A, E, and K. B complex vitamins may also be replaced.
3. Tube feedings or TPN may be necessary.

NURSING IMPLICATIONS FOR PATIENTS WITH GALLBLADDER DISORDERS

Responsibilities of nurses treating patients with gallbladder disorders include the following:

1. Evaluate the low-fat diet for adequacy of fat-soluble vitamins and substitute alternate sources of the vitamins, if necessary.
3. Assess the patient’s tolerance for foods that cause discomfort and flatulence. Omit those from the diet.
4. Assure nutritional adequacy of a diet with removal of foods not tolerated and substitution of alternate sources as needed.
5. Implement adequate patient education regarding tissue repair after a cholecystectomy.
6. Be alert to the correlation between obesity and gallstones.
7. Be alert to the correlation between dieting and gallstones.

NURSING IMPLICATIONS FOR PATIENTS WITH PANCREATITIS

1. The patient should be taught that no alcohol or caffeine can be tolerated in his or her diet. Sources of caffeine include coffee, tea, and cola beverages.
2. The patient can develop diabetes if the islet cells of the pancreas malfunction. Evaluate frequently for symptoms. If diabetes develops, a calculated diet will be used.
3. Pancreatic enzymes come in capsule and tablet form and should be swallowed whole. They should not be given with hot food or liquids, to avoid breaking their protective coating. They are taken only with meals.
4. The patient with pancreatitis has a poor appetite and may not eat well enough to repair damage done. The patient may not enjoy the type of modifications required. Extra support, encouragement, and counseling are necessary.
5. Be able to supply sources of group support and counseling to patients whose disease is caused by alcoholism: The person who is alcohol dependent cannot usually abstain from alcohol without support.

Progress Check on Activity 2

FILL-IN

1. Fill in the sheet marked Exercise 19-2 for a low-fat diet.
2. Alter the following day’s menu to make it suitable for a patient on a low-fat diet (50 g). Calories are not restricted. Do not change more than is necessary to meet the diet’s restriction.

Breakfast
Orange juice
Oatmeal with half-and-half and sugar
Fried egg
Toast with butter and jelly
Coffee
Lunch
Pork chop with dressing
Buttered green beans
Corn on the cob
Roll
Butter
Milk and tea with sugar
Dinner
Spaghetti with meat sauce
Tossed green salad/Italian dressing
French bread/butter
Ice cream with fudge sauce
Red wine
Coffee

3. Write a 1-day menu for a patient who has chronic pancreatitis and has lost 20 lb since the onset two months ago.

4. Risk of gallstone formation can be reduced with:
   a. ______________
   b. ______________
   c. ______________

TRUE/FALSE
Circle T for True and F for False

5. T F People who are obese are more likely to have gallstones than people who are at a healthy weight regardless of where the fat is.

6. T F Weight loss at any rate has no effect on gallstone formation.

7. T F People on a very low-calorie diet (VLCD) have a greater risk of developing gallstones.

8. T F Weight cycling does not increase the risk of developing gallstones.

9. T F Gallstone formation is correlated with obesity and dieting.

REFERENCES

Exercise 19-2 A practice on the dietary management of gallbladder disease and nursing implications

<table>
<thead>
<tr>
<th>Diet</th>
<th>Disease or Condition</th>
<th>Foods Allowed</th>
<th>Foods Limited</th>
<th>Foods Forbidden</th>
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<td>Low-fat diet</td>
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PART III NUTRITION AND DIET THERAPY FOR ADULTS


Diet Therapy for Renal Disorders

Time for completion
Activities: 1 hour
Optional examination: ½ hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:
1. Discuss the use of diet therapy in renal disorders.
2. Describe the therapeutic diets used in renal disorders and the rationale for their use.
3. List appropriate nursing interventions to promote adequate nutrition in a patient with renal disease.

GLOSSARY

Albuminuria: albumin in the urine.
Antigen-antibody response: antigens are those substances that induce an immune response (the foreign invaders); they react with antibodies, which are the immune bodies that destroy the invaders.
Azotemia: nitrogenous compounds in the blood.
BUN: blood urea nitrogen.
CAPD: continuous ambulatory peritoneal dialysis: dialysis performed by the patient in a continuous process.
CCPD: continuous cyclic peritoneal dialysis: dialysis by a machine that performs frequent exchanges of dialysate while the patient is sleeping.

CNS: central nervous system.

Collagen disease: a disease that attacks the connective tissue of the body, such as rheumatoid arthritis, lupus erythematosus, or rheumatic fever.

CRF: chronic renal failure.

Dialysis: the passing of molecules in a solution through a semipermeable membrane, passing from the side with the higher concentration of molecules to the side with the lower concentration (a method used in cases of defective renal function to remove from the blood those elements that are normally excreted).

Diaphoresis: perspiration (sweating), especially profuse perspiration.

Filtration: the process of eliminating certain particles from a solution.

Glomerulus: a small cluster of capillaries encased in a capsule in the kidney; a part of the nephron.

HD: hemodialysis: use of a machine (artificial kidney) outside of the body to remove waste products from the patient’s blood.

Hematuria: blood in the urine.

Hyperphosphatemia: high blood phosphate level.

Hypocalcemia: low blood calcium level.

LBV: Low biological value (protein).

Nephron: the basic unit of the kidney. Each nephron can form urine by itself, and each kidney has approximately one million nephrons. Each glomerulus brings blood and waste products to the nephron, which filters it continuously and produces urine, which carries the wastes to be eliminated. Excess sodium, potassium, and chloride are also eliminated in urine, and blood is reabsorbed.

Oliguria: diminished urine secretion in relation to fluid intake (less output than intake).

Oxalate: a salt of oxalic acid. A poisonous acid found in various fruits, vegetables, and metabolism of ascorbic acid. It combines with calcium and is excreted in urine. High concentration may cause urinary calculi.

Proteinuria: presence of proteins in the urine.

Pyuria: presence of pus in the urine.

Renal: pertaining to the kidney.

Renal calculi: formation of mineral stones, usually calcium, in the renal tubules.

SOB: shortness of breath.

Uremia: presence of urinary constituents in the blood.

**Background Information**

The kidney is an organ of excretion, conversion, secretion, reabsorption, manufacture, and regulation. Its structural and functional unit is the nephron. The nephron has a glomerulus attached to a long tube that empties into collecting ducts. Urine enters via the ureter and leaves at the rate of 1000 to 1500 ml per day. The convoluted tubule, known as Henle’s loop, filters blood that circulates through it. It excretes nitrogenous waste: ammonia, urea, uric acid, and creatinine, as well as toxic substances ingested or formed from body metabolism. These substances are excreted in water that is not reabsorbed at the time. The glomerulus holds back in circulation large molecules such as blood proteins. Another function of the kidney is the manufacture of erythropoietin, which stimulates the formation of red blood cells in bone marrow. The kidney also converts inactive vitamin D to the active form the body uses and releases into the blood stream, but does not excrete, thus maintaining the calcium to phosphorus ratio in the bone.

The kidney, along with the lungs, regulates the blood pH by restoring neutrality. This is accomplished by secreting hydrogen ions when there is too much acid, and excreting bicarbonate when it is too alkaline. Electrolytes and other substances such as amino acids, glucose, sodium chloride, and vitamin C are either excreted or reabsorbed, depending upon what the blood needs to maintain homeostasis. The kidney also helps regulate blood pressure.

Each kidney contains over a million nephrons. Loss of half of these, such as donation of a kidney or loss of one in an accident, does not affect kidney function. Kidney function diminishes with age, and the elderly person may have only a one-half to two-thirds filtration rate compared to a young adult. However, kidney function is still adequate unless disease occurs.

Mechanisms of kidney function and the role of nutrition in maintaining them are discussed in the following activities.

**Activity 1:**

**Kidney Function and Diseases**

Because the kidney is such a major factor in the maintenance of body homeostasis, there is little doubt that the consequences are extremely serious any time disease occurs and the kidneys fail. Renal disease can be caused by damage to the kidneys themselves or by other diseases such as diabetes, atherosclerosis, or hypertension.

The most common terms used in describing kidney malfunctioning are hematuria, proteinuria, pyuria, albuminuria, oliguria, azotemia, and uremia. These conditions are dangerous to health.

In addition to excretory functions for maintenance of chemical homeostasis, balancing of body fluids, and maintenance of normal pH, the kidney controls blood pressure. Changes in sodium balance affect blood pressure as well as the rise in renin levels. Renin is a proteolytic enzyme secreted by the kidneys, which acts in blood plasma to form angiotensin II, a powerful
vasoconstrictor. This further elevates blood pressure. Most patients with renal disease have hypertension.

The damaged kidney also decreases its production of erythropoietin, which is a critical determinant of erythroid activity. This deficiency results in the severe anemia present in chronic renal disease.

The diseased kidneys will cease to produce the active vitamin D hormone so necessary to maintain the calcium-phosphorus ratio in the bone. Serum phosphorus levels rise as the kidneys are no longer able to excrete phosphorus. Hyperphosphaturia occurs and lowers serum calcium levels. Also, calcium is not absorbed from the gut because calcitrol is not present. Renal osteodystrophy is the result of these imbalances. Osteodystrophy is the condition whereby the bones become soft and calcium is deposited in the soft tissues. It is a common, complex, and usually inevitable outcome of renal disease.

Diseases of the kidney, whether acute or chronic, have many causes. The origin of the disease and the portion of the nephron it affects will determine the symptoms and subsequent treatment. Depending upon the type, kidney disease may produce a nephrotic syndrome with significant protein loss, decreased overall renal function, or a combination of these. Objectives of nutritional care will depend upon the abnormality to be treated. Causes, symptoms, and dietary management of various disorders are described in the following sections.

ACUTE NEPHROTIC SYNDROME

An example of the acute nephrotic syndrome is glomerulonephritis, caused by poststreptococcal infection, which may occur in tonsil, pharynx, or skin. It is most common in children and adolescents. Symptoms vary from mild to severe: fever, discomfort, headache, slight edema, decreased urine volume, mild hypertension, hematuria, proteinuria, and salt and water retention. Prognosis ranges from complete recovery to renal failure.

Dietary management of acute nephrotic syndrome is controversial. Some clinicians prefer restriction of protein, fluid, and sodium intakes, while others do not.

Diet Modification

Acute glomerulonephritis in children is not usually considered crucial unless complications arise. They are generally placed on bed rest with antibiotic drug therapy. The fluid intake will be adjusted to output, including losses from diarrhea and/or vomiting.

Diet therapy may be similar to the initial management of acute renal failure, that is, 25 g of protein (70%–80% HBV) and 500 milligrams of sodium. Fluid permitted varies with the patient. HBV refers to the high biological value of protein. Protein in a restricted diet such as this must be from those foods furnishing the greatest amount of essential amino acids. Milk and eggs are the standard, with meat, fish, and poultry following.

NEPHROTIC SYNDROME

This disorder covers a group of symptoms resulting from kidney tissue damage and impaired nephron function. It may also occur because of other diseases such as diabetes or collagen disease, or from drug reactions, infections, or chemical poisoning. Causes are unknown in some patients. The symptoms are massive edema, proteinuria, and body wasting. Dietary management covers the restoration of fluid and electrolyte balance, reversal of body wasting, and correction of hyperlipidemia, if present.

ACUTE RENAL FAILURE

Acute renal failure includes an abrupt renal malfunction because of infection, trauma, injury, chemical poisoning, severe allergic reaction, or pregnancy. The symptoms are nausea, lethargy, and anorexia. Oliguria may be present at first, followed by diuresis. Azotemia may also be present. Acute renal failure is a life-threatening situation and requires immediate medical management.

Dietary management includes the restoration of fluid and electrolyte balance, elimination of azotemia, and implementation of nutritional rehabilitation. The dietary treatment is similar to that for acute glomerulonephritis. Many patients need dialysis, especially if they are progressing to chronic renal failure.

CHRONIC RENAL FAILURE

Chronic renal failure results from a slow destruction of kidney tubules and may be due to infection, hypertension, hereditary defect, or drugs. Dietary management involves the balancing of fluid and electrolytes, correction of metabolic acidosis, minimization of the toxic effect of uremia, and implementation of nutritional rehabilitation.

**PROGRESS CHECK ON BACKGROUND INFORMATION AND ACTIVITY 1**

**MULTIPLE CHOICE**

Circle the letter of the correct answer.

1. The functional unit of the kidney is the:
   a. tubule.
   b. glomerulus.
   c. nephron.
   d. ureter.

2. Approximately how many ml of water leave the body via the kidney per day?
   a. 1000–1500
   b. 2000–2500
3. Neutrality is restored to the body by the kidney in which of these ways?
   a. reabsorption of electrolytes
   b. secretion of hydrogen ions
   c. excretion of bicarbonate
   d. all of the above

4. The vitamin whose activity depends upon efficient kidney function is:
   a. ascorbic acid.
   b. B12.
   c. D.
   d. retinol.

5. When a person loses one kidney through accident or donation, kidney function is altered by:
   a. 1⁄4.
   b. 1⁄2.
   c. 2⁄3.
   d. 0.

6. An elderly person’s kidney function may be altered by:
   a. 0–1⁄4.
   b. 1⁄4–1⁄2.
   c. 1⁄2–2⁄3.
   d. 3⁄4–1.

FILL-IN

The kidney performs six major functions. Name them and give one example of each function.

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Name five of the most common terms used in kidney malfunctioning, and define the term.

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Define:

18. Renin ____________________________

19. Osteodystrophy ____________________

20. HBV protein ______________________

ACTIVITY 2:

Kidney Disorders and General Dietary Management

DESCRIPTION AND GENERAL CONSIDERATIONS

As indicated in Activity 1, there are several types of kidney disorders. No matter what type it is, the kidney fails to function properly. A kidney disorder or renal failure may be the result of diseases that involve the nephron, such as untreated glomerulonephritis, insulin-dependent diabetes, infectious renal vascular disease, or congenital abnormalities. The clinical symptoms result from the loss of functioning nephrons and decreased renal blood flow, as well as inability of the kidney to concentrate urine, or to maintain acid-base and electrolyte balance. Dehydration or water toxicity may occur if the amount of ingested fluid is not carefully controlled.

Metabolic acidosis occurs in advanced stages because of reduced excretion of phosphate sulfates and organic acids from food metabolism. These substances increase in body fluids, displacing the bicarbonates.

Sodium balance cannot be maintained by the failing kidney. Any increase in sodium intake will result in edema, as the sodium is not excreted.

Nitrogen retention and anemia, as well as increasing hypertension, are all a direct result of advancing deterioration of the nephrons. Laboratory findings indicate azotemia and elevated BUN, serum creatinine, and uric acid levels.

Depending on the clinical stage, renal failure in any form may lead to acute malnutrition with its myriad symptoms. The health professional will observe weakness, lethargy, fatigue, SOB, oral and GI bleeding, diarrhea, vomiting, CNS involvement, ulceration in the mouth, fetid breath, and increased susceptibility to any infection, as well as the aching and pain in bones and joints due to the osteodystrophy.
DIETARY MANAGEMENT

The dietary management is specific for each type of kidney disorder or renal failure and is usually individualized. However, there are many commonalities in diet therapy, which are discussed in the next section. It provides those general considerations in the dietary management of patients with renal failure. In practice, the attending physician and a registered dietitian individualize the dietary strategies applicable to specific clinical stage and patient conditions.

The following are the general principles of dietary management in renal disease:

1. Achieve a balance between intake and output.
2. Alleviate symptoms.
3. Maintain adequate nutrition.
4. Retard progression of renal failure in order to postpone dialysis.

Diet therapy is focused on controlling five nutrients: protein, sodium, potassium, phosphorus, and fluids. Levels of each nutrient need to be individually adjusted according to progression of the illness, type of treatment being used, and the patient’s response to treatment.

Generally the following dietary restrictions apply:

1. Sodium: 1500–3000 mg
2. Potassium: generally no restriction from food sources. Potassium chloride (salt substitutes) may not be used in renal patients.
3. Phosphorus restriction varies. Whenever protein is reduced in the diet, the dietary source of phosphorus falls. Further restriction is usually unwarranted unless serum phosphorus is elevated. As renal disease progresses, and diet alone cannot control phosphorus, phosphate binders become necessary. Calcium-based phosphate binders are recommended and the use of aluminum-based binders contraindicated because of the potential for aluminum toxicity.
4. Protein: 0.6 g/kg body weight is the lowest recommended level plus 24-hour urinary protein loss. For patients at nutritional risk and those who cannot adhere to the diet, raising the protein allowance to 0.7–0.8 g/kg body weight may become necessary. Patients with IDDM are generally recommended to have 0.8 g/kg body weight because insulin deficiency increases the rate of protein degradation. At least 75% of protein should come from HBV protein; the use of eggs should be encouraged because of their high biological quality: high protein foods should be distributed over 24 hours.
5. Calories: adjusted for slow weight gain, maintenance of weight, or slow weight loss as necessary. Calories should be from carbohydrate and fat.
6. Fluid: intake to be calculated. Urine output is the usual pattern for determining fluid intake.

Individual needs vary. Each person’s weight, blood pressure, and urine output must be monitored to determine exact needs. Body weight and blood pressure will increase if the person is retaining sodium (and fluid). The person’s weight and blood pressure will fall if sodium intake is too low. Calcium carbonate supplements are sometimes ordered by the doctor. Calcium should be supplemented to 1200–1600 mg/day. Calcium carbonate and calcium acetate are considered the appropriate supplements.

Fat-soluble vitamins are not supplemented. Water-soluble vitamins may require supplementation due to deficiencies arising from anorexia, uremia, and altered metabolism. Treatment with vitamin supplementation is on an individual basis.

NATIONAL KIDNEY FOUNDATIONS

The National Kidney Foundation (www.kidney.org) recommends the following nutritional intakes for two types of kidney patients, among others.

Chronic Renal Insufficiency

Using a patient with a glomerular filtration rate (GFR) of 5–60 ml/min as an example, the nutritional intakes are as follows:

1. Protein: The patient should receive 0.55–0.60 g/kg/day. At least 0.35 g should be derived from those with high biological value (HBV).
2. Energy: The patient should receive at least 35 kcal/kg/day.
3. Phosphorus: The patient should be restricted to 10 mg/kg/day.
4. Calcium: Intake is regulated so that an acceptable level is maintained in the serum.
5. Fluid: Intake is regulated by output. The replacement for daily loss is accompanied by an addition of 500 ml.

Acute Renal Failure

The following are recommendations for nutritional intakes for a patient with acute renal failure:

1. Protein: The patient is advised to take in 0.6–0.8 gm/kg body weight (ideal or standard).
2. Sodium: The patient is allowed 1–2 gm/day depending on blood pressure, fluid retention, and status of diuretic phase.
3. Potassium: The patient is allowed 2 gm/day to replace loss from diuretic treatment. The serum phosphorus level should be maintained at less than 5 mEq/l.
4. Phosphorus: Intake is regulated so that an acceptable level is maintained in the serum.
5. Calcium: Intake is regulated so that an acceptable level is maintained in the serum.
6. Fluid: Intake is regulated by output. The replacement for daily loss is accompanied by an addition of 500 ml.
7. Vitamins/minerals: The daily intake is adjusted to reflect patient metabolic status. Patients receiving total parenteral nutrition (TPN) are usually given higher doses of these two nutrients.

8. Fiber: Though an intake of 20–25 gm/day is recommended, the actual intake level will depend on the clinical status of the patient.

Renal Exchange Lists

Refer to Chapter 1 on the use of food exchange lists in general. For the last 25 years, the National Kidney Foundation (NKF) has been the main organization that has gradually developed comprehensive food exchange lists to assist patients with kidney disorders who require a very structured dietary regimen.

For most kidney patients, a diet prescription revolves around five nutritional requirements:

- Calories
- Protein
- Sodium
- Potassium
- Phosphorus

Example: The attending medical team for a patient determines that a nondiabetic kidney patient daily intake should be:

- Calories: 2100 kcal
- Protein: 60 g
- Sodium: 2 g
- Potassium: 15 or less mg

To comply with this prescription, it will be transformed into a meal plan for breakfast, lunch, and dinner. The information is then provided to the patient. Obviously, the task becomes large when the patient must have a variety of meal plans to avoid eating the same food daily. Currently, there are two ways to make such plans available.

Over the last 25 years, the NKF has systematically developed food exchange lists for kidney patients for the major food groups: milk, meat, starches, vegetables, fruits, and fats. Within each food group, the NKF determines nutrients contributed by one serving of a food item. For example, each serving (e.g., ½ c milk or ¼ c evaporated milk) within the milk group will contribute: 120 kcal, 4 g protein, 80 mg sodium, 185 mg of potassium and 11 mg of phosphorous. Thus the exchange lists for milk group will provide many foods, each serving of which contributes the same amount of nutrients.

Using similar approaches, the nutrients contributed by one serving of a food item in meat, starches, and so on are also determined. Finally, the NKF issues the food exchange lists for all major food groups.

Using such exchange lists, dietitians and other health professionals have developed many meal plans to comply with dietary prescriptions ordered by the health team. They are then made available to hospitals, medical clinics, community healthcare centers, and so on. These organizations in turn distribute them to the patients.

At the same time, many bookstores sell books devoted entirely to dietary care for kidney patients. Most of them are written by health professionals. Many patients buy such books to have more varieties of meal plans.

At this age of computer technology, there are many types of software available to provide the same information. Using a home computer with such software, a patient can type in his or her dietary prescription and be shown the appropriate meal plans.

NURSING IMPLICATIONS FOR ACTIVITIES 1 AND 2

Caloric Intake

1. Be aware that adequate caloric intake is an important health requirement for renal patients.
2. Plan menus knowing that high caloric intake is difficult to accomplish if grains and starchy vegetables are excluded or severely limited.
3. Use caloric-dense items such as heavy cream, sweets, and carbonated beverages to provide calories when they are needed.

The recommended 30% of total calories from fat with only 10% from saturated fats may not be feasible for patients with renal disease. It may be necessary to abandon fat restrictions in order to meet energy needs and supply enough calories to prevent protein from being used for energy. Complex carbohydrates contain LBV protein, which must be counted as part of the total protein allowance, and so are limited. Saturated fat and cholesterol can be reduced if necessary by using more polyunsaturated and monounsaturated types of fats.

Fluid

1. Apportion the limited fluid intake equally throughout the waking hours.
2. Keep the patient’s mouth clean and moist when fluids are restricted.
3. Compensate for diarrhea or diaphoresis by prescribing additional fluid intake.
4. Be aware that proper eating posture is needed for patients with edema and ascites. For example, sitting upright causes discomfort and anorexia for this group of patients.

Diet Compliance

1. Plan diets with the knowledge that patients dislike a diet with little bread, potato, and other low-biological value protein foods. Such diets are unpalatable and
will be further rejected by patients with nausea, vomiting, and anorexia.

2. Realize that when a patient does not comply with a diet, treatment is handicapped and prolonged.

3. Through patient education, help the patient understand the problems and make an effort to comply with the dietary prescription.

**Progress Check on Activity 2**

**MULTIPLE CHOICE**

Circle the letter of the correct answer.

1. Chronic renal failure usually occurs over a long period of time from diseases that affect the nephron. Included are all except which of these diseases?
   a. renal osteodystrophy
   b. congenital abnormalities
   c. untreated glomerulonephritis
   d. insulin-dependent diabetes

2. Reduced secretion of phosphate, sulfates, and organic acids from ingested foods results in:
   a. metabolic alkalosis.
   b. metabolic acidosis.
   c. edema.
   d. ascites.

3. Hypertension in renal failure is usually the result of:
   a. sodium retention.
   b. calcium excretion.
   c. metabolic acidosis.
   d. erythrocyte reduction.

4. General dietary restrictions include which of these nutrients?
   a. calcium, phosphorus, vitamin D
   b. calcium, phosphorus, potassium
   c. sodium, protein, water
   d. all of the above

5. There is an increase in ______ if a patient is retaining sodium.
   a. blood pressure and weight
   b. fluid and acidosis
   c. calcium and appetite
   d. pulse and respiration

**SHORT ANSWER**

List six nursing implications for patients on a renal diet (two from each category of fluid, calorie, and compliance).

6. 

7. 

List the four general principles of dietary management in renal disease.

8. 

9. 

10. 

11. 

**ACTIVITY 3:**

**Kidney Dialysis**

**DEFINITIONS AND DESCRIPTIONS**

Dialysis refers to the diffusion of dissolved particles (solute) from one side of the semipermeable membrane to the other. Kidney dialysis was started in 1960 and has helped many uremic patients since then. Basically, two kinds of dialysis are used to treat the end stage of renal failure: hemodialysis and peritoneal dialysis.

Hemodialysis, sometimes known as extracorporeal dialysis, uses a machine (artificial kidney) outside the body. Blood is drawn or pumped out of the body and made to circulate through a special machine equipped with a synthetic semipermeable membrane. The dialysate in this case also contains glucose and electrolytes, which resemble concentrations of blood plasma found in the body. Much nitrogenous waste from the patient’s blood plasma diffuses into the dialysate. The cleansed blood is returned to the patient’s body and the used dialysate is replaced with fresh. The patient undergoes hemodialysis two to four times a week for three to six hours at a time in the hospital or at a dialysis center. Between dialysis treatments, nitrogenous waste products, potassium and sodium, and fluids accumulate, and dietary modifications are necessary to control them. Serum amino acids and water-soluble vitamin supplements are necessary.

Peritoneal dialysis may be intermittent or continuous. With intermittent dialysis a catheter is placed in the abdominal cavity and one to two liters of dialysis fluid introduced into the abdominal cavity and removed every hour. This process is repeated until the blood urea drops to normal levels. Loss of blood protein and amino acids are greater in peritoneal dialysis than in hemodialysis.

With continuous ambulatory peritoneal dialysis (CAPD), the patient does his or her own dialysis, and the process is continuous. The fluid (dialysate) is introduced into the peritoneal cavity and remains there for four to
six hours, allowing waste products to diffuse into the dialysate. The dialysate is then drained and replaced with fresh fluid. With CAPD, no dietary restriction of fluid, sodium, or potassium is necessary. However, calcium supplements may be needed, and phosphorus is restricted. No phosphate-binding antacids are used. The dialysate contains dextrose, which is absorbed by the body. Calorie control and an exercise program may be needed to prevent excess weight gain. In addition, the extra dextrose can lead to elevated triglycerides and a lower level of high-density lipoproteins (HDLs), increasing the risk of coronary heart diseases. Protein and amino acid losses are minimal and are easily replaced by diet. Continuous cyclic peritoneal dialysis (CCPD) uses a machine that performs frequent exchanges of dialysate while the patient is sleeping. The dialysate is left in place during the day.

Both CAPD and CCPD require that the patients and/or their caregivers receive training in aseptic technique and dialysate exchange, as these treatments are carried out at home.

NURSING IMPLICATIONS FOR ACTIVITY 3

Reluctant Patients

Be aware that patients being transferred from hemodialysis to CAPD are often reluctant to give up their restrictive diets. Explain clearly the possible effects of a restricted diet while on CAPD:

1. Hypotension and dizziness from sodium depletion
2. Nausea, vomiting, irregular heartbeat, and muscle weakness from potassium depletion
3. Dehydration due to rapid fluid removal

Dietary Regime

The following counseling plan is used with success at many clinics as a guide for patients on peritoneal dialysis:

1. High protein: 1.2–1.5 g/kg body weight.
2. Limit phosphorus intake to 1200 mg/day.
   a. Nuts and legumes—one serving/week
   b. Dairy products—½ c daily
   c. Eggs—no more than one
3. High potassium—eat a wide variety of fruits and vegetables daily.
4. High fluid intake to prevent dehydration.
5. Limit or avoid sweets and fats.
6. Control weight. Incorporate the extra calories from dialysate into total calories for the day.
7. Encourage adequate consumption. CAPD patients are often anorexic.

The dietary modifications for patients undergoing hemodialysis differ in several aspects from peritoneal dialysis or CAPD. The differences are as follows:

1. Dietary potassium is controlled. The amount of potassium a person can tolerate will depend on his or her body size, amount of renal function remaining, and whether there is infection or protein catabolism. The physician determines when restrictions are necessary to keep K+ from rising above safe levels. A daily intake of 1950–3100 mg per day is usually prescribed.
2. Sodium and fluids are regulated to the individual. If the person gains excessive weight between dialysis treatment, they are reduced. No weight gain between treatments indicates that both should be increased.
3. The majority of hemodialysis patients require calcium supplementation.
4. Water-soluble vitamins are supplemented; fat-soluble vitamins are not given routinely.
5. Diabetic patients on hemodialysis require an exchange list different from the American Dietetic Association’s exchange lists for meal planning. This is because of the need to control the sodium, potassium, and phosphorus content of the diet; the amount of these nutrients in each food choice must be calculated as well as the usual amount of protein, carbohydrate, and fat. The ADA publishes a guide: A Healthy Food Guide, Diabetes and Kidney Disease, National Renal Diet. This guide was compiled by the Renal Dietetic Practice Group of the American Dietetic Association and the National Kidney Foundation, Council on Renal Nutrition. The Kidney Foundation also publishes a brochure on dining out for renal patients. See the References section for addresses.

PATIENT EDUCATION AND COUNSELING

1. The nurse is an integral part of the multidisciplinary health team. Education of the patient involves a full assessment of the individual’s nutrition, medical, sociological, economic, and psychological status.
2. Recognize that this is a permanent adjustment for the individual and his or her family, and it will disrupt their lifestyles.
3. As the disease progresses there will be progressively more difficult restrictions. Some patients may adapt, others will not.
4. Emotional support, psychological counseling, and informational support are needed to cope with all the adjustments that must be made.
5. Crises and personal loss are ever-present factors in renal disease.

MAJOR RESOURCES

Apart from hundreds of private and government publications on nutrition, diet, and kidney disorders, two major professional organizations (American Dietetic Association [ADA] and the National Kidney Foundation [NKF]) have
developed and distributed guideline documents that are used by professionals and health facilities throughout this country. They are as follows:

1. A Clinical Guide to Nutrition Care in End-Stage Renal Disease (3rd edition in progress)

Health professionals should consult these resources in patient care.

TEAMWORK

The dietary treatment of patients with kidney disorders is best done by teamwork as confirmed by the latest clinical observations:

1. The low-protein diets used in renal disease study have been found to be safe for periods of 2 to 3 years. Declines in protein and calorie intake are of concern because of the potential adverse effects of protein calorie malnutrition. Some individuals exhibit low body weight and altered anthropometric and biochemical data. Continuous dietary surveillance is needed, and the diet of patients with end-stage renal disease must be carefully monitored during treatment.

2. Marked improvements in the administration of dialysis has not been matched by the protein and caloric therapy provided to dialysis patients. Intensive assessment and documentation of malnutrition and medical nutrition therapy is highly recommended if the outcomes of dialysis patients are to be positively affected.

3. Malnutrition is an important risk factor for mortality among dialysis patients. Malnutrition is mild to moderate in approximately 33% of dialysis patients and severe in approximately 6%–8%. The underlying causes of malnutrition in this population include low nutrient intake, underlying illnesses, and the dialysis procedure itself.

4. The National Institutes of Health Consensus Development Conference on Morbidity and Mortality of Dialysis brought together experts from a number of disciplines including nephrology, pediatrics, and nutrition to prepare a consensus statement on a number of issues related to dialysis of renal patients. Among their findings, the consensus panel concluded that medical nutrition therapy is critical to the effective treatment of patients with renal disease, and trained dietitians are best suited to provide such nutritional intervention.

In each of these findings, the combined contribution from a nurse and a dietitian in the multidisciplinary team is the most desirable. Qualified dietitians are trained to monitor the nutrition status of dialysis and predialysis patients. The nurse is on the front line to provide clinical observations and to implement nutritional and dietary intervention.

PROGRESS CHECK ON ACTIVITY 3

FILL-IN

Define or describe fully:

1. Dialysis ____________________________

2. Hemodialysis ____________________________

3. Peritoneal dialysis ____________________________

4. Dialysate ____________________________

5. CAPD ____________________________

6. Name the four waste products from the patient’s blood that are diffused into the dialysate:
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________

7. Two reliable resources on renal disease information are:
   a. ____________________________
   b. ____________________________

8. Three important guideline documents for health professionals responsible for renal diseases are:
   a. ____________________________
   b. ____________________________
   c. ____________________________

MULTIPLE CHOICE

Circle the letter of the correct answer.

9. Which of these nutrients should be restricted in the diet of the person on CAPD?
   a. sodium
   b. potassium
10. The amount of protein needed for a patient on peritoneal dialysis is:
   a. 0.4–0.6 g/kg body weight
   b. 1.0–1.2 g/kg body weight
   c. 1.2–1.5 g/kg body weight
   d. 0.8 g/kg body weight

11. Effects of a severely restricted diet on a patient with CAPD include all of these except:
   a. hemorrhagic shock.
   b. nausea and vomiting.
   c. heart arrhythmias.
   d. dehydration.

12. Caloric control and exercise are necessary for CAPD patients because:
   a. patients gain excess weight from being immobilized.
   b. fluid is more easily excreted in this way.
   c. the dialysate contains absorbable dextrose.
   d. amino acids are converted to energy.

MATCHING
Match the food item on the left with its recommendation on the right for a person on peritoneal dialysis. Write the appropriate letter in the space provided.

13. eggs a. increase potassium intake
14. oranges/bananas b. decrease phosphorus intake
15. nuts and legumes c. increase to prevent dehydration
16. water d. limited to one serving
17. milk e. limited to ½-cup serving

TRUE/FALSE
Circle the letter of the correct answer.

18. T F Dietary treatment of patients with kidney disorders is best done by teamwork of a nurse and a dietitian.

19. T F Low-protein diet can be used by renal disorders patients indefinitely without side effects.

20. T F Malnutrition is an important risk factor for mortality among dialysis patients.

ACTIVITY 4:
Diet Therapy for Renal Calculi

CAUSES OF KIDNEY STONES
Although the basic cause of kidney stones is unknown, there are many direct and indirect contributing factors. These factors include the chemistry of the urine and/or the conditions of the urinary tract.

Calcium Stones
By far the majority of kidney stones—about 96%—are composed of calcium compounds. The calcium usually combines with phosphates or oxalates. Excessive urinary calcium may result from prolonged use of high-calcium foods such as milk and dairy products, from alkali therapy for peptic ulcer, or from continued use of a hard water supply. Also, excess vitamin D may cause increased calcium absorption from the intestine, as well as increased calcium extraction from the bone. Prolonged immobilization such as occurs in body casting, long-term illness, or disability may lead to withdrawal of calcium from the bones and increased calcium in the urine.

Uric Acid Stones
Three percent of kidney stones are uric acid stones, while cystine stones average only 1% (cystine is an amino acid that accumulates in urine from a hereditary disorder). Uric acid stones may come from rapid tissue breakdown (body wasting), prolonged use of high-protein and low-carbohydrate fad diets, and purine breakdown (purine is a body by-product).

Urinary Tract and Stone Formation
Stone formation is facilitated by the following:
1. Concentrated urine (examples include not drinking enough fluid, excessive sweating)
2. Favorable urine acidity (the lower the acidity of the urine, the higher the calcium stone formation; high-acid urine favors uric acid stone formation)
3. Vitamin A deficiency (the resulting changes in the urinary tract tissue favor stone formation)
4. Recurrent urinary tract infections

DIETARY MANAGEMENT
Using diet therapy to manage kidney stones is only part of the medical regimen. The overall dietary treatment is based on the type of stone. Dietary recommendations to treat kidney stones are as follows:
1. Drink a lot of fluid. This will dilute the urine and flush out the stones in some patients. It is ineffective for other patients.
2. Reduce intake of the components of the stones. For example, a calcium stone may be treated with a low-calcium diet. A stone containing primarily phosphorus may be treated with a low-phosphorus diet. The same applies to stones with oxalic acid. When the stone component changes, these therapeutic diets
simultaneously change the pH (acidity or alkalinity) of the urine as indicated:

<table>
<thead>
<tr>
<th>Stone Chemistry</th>
<th>Diet Modification</th>
<th>Urinary pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>Low calcium</td>
<td>acid ash</td>
</tr>
<tr>
<td></td>
<td>(800 mg)</td>
<td></td>
</tr>
<tr>
<td>Phosphate</td>
<td>Low phosphate</td>
<td>acid ash</td>
</tr>
<tr>
<td></td>
<td>(1000 mg)</td>
<td></td>
</tr>
<tr>
<td>Oxalate</td>
<td>Low oxalate</td>
<td>acid ash</td>
</tr>
</tbody>
</table>

Stones composed of uric acid, cystine, and struvite are unresponsive to diet modifications. Stones composed of calcium oxalate and calcium phosphate are responsive to treatment and diet modification.

3. Change the acidity or alkalinity of the urine by eating certain foods.

To illustrate the use of a low-calcium diet, Tables 20-1 and 20-2 show a meal plan and menu, respectively, for an 800-mg calcium diet. Table 20-3 classifies foods according to their acid-base reactions in the body. The acidity or alkalinity of the urine can be modified by consuming more of the appropriate type of foods.

**NURSING IMPLICATIONS**

**Calcium Intake**

1. Although milk can increase an acid urinary pH, it is high in calcium.
2. A low-calcium diet should include foods fortified with vitamin D, which promotes absorption of calcium.
3. Ascertain calcium content of drinking water. If necessary, use packaged beverages or distilled water for drinking and food preparation.

**TABLE 20-1** Daily Meal Planning for a 800-mg Calcium Diet

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Example</th>
<th>Approximate Calcium Content (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk, cheese, eggs</td>
<td>2 c reduced-fat milk</td>
<td>600</td>
</tr>
<tr>
<td>Breads and equivalents</td>
<td>3 slices bread</td>
<td>60</td>
</tr>
<tr>
<td>Cereals, flour 1 c</td>
<td>Puffed rice</td>
<td>7</td>
</tr>
<tr>
<td>Meat, poultry, fish</td>
<td>3 oz chicken; 4 oz lamb; 1½ oz shad, baked</td>
<td>30</td>
</tr>
<tr>
<td>Vegetables</td>
<td>½ c beets, cooked; ½ c eggplant, cooked</td>
<td>30</td>
</tr>
<tr>
<td>Fruits</td>
<td>⅜ c applesauce; 2 med. nectarines; 1 med. apple</td>
<td>20</td>
</tr>
<tr>
<td>Fats</td>
<td>5–6 servings bacon fat, salad dressings, and others</td>
<td>5</td>
</tr>
<tr>
<td>Potatoes and equivalents</td>
<td>⅜ c noodles</td>
<td>15</td>
</tr>
<tr>
<td>Soup (broth of permitted meats or soups made with permitted ingredients)</td>
<td>⅜ c vegetable-beef</td>
<td>5</td>
</tr>
<tr>
<td>Beverages</td>
<td>2–4 servings</td>
<td>10–20</td>
</tr>
<tr>
<td>Desserts</td>
<td>1 c flavored gelatin</td>
<td>5</td>
</tr>
<tr>
<td>Miscellaneous (sugar, nondairy creamer, sweets, etc.)</td>
<td>No limit</td>
<td>0</td>
</tr>
</tbody>
</table>

**TABLE 20-2** Sample Menu for a 800-mg Calcium Diet

**Breakfast**
- Juice, cranberry, ⅜ c
- Farina, ⅜ c
- Bread, 1 slice
- Margarine, 2 tsp
- ⅜ c reduced-fat milk
- Salt, pepper; sugar
- Imitation cream, nondairy creamer, or coffee whitener
- Coffee or tea

**Lunch**
- Soup, tomato, made with milk, ⅜ c
- Chicken, boneless, canned, 3 oz
- Mushrooms, canned, ⅜ c
- Bread, 1 slice
- Butter or margarine, 2 tsp
- Pears, canned, ⅜ c
- Salt, pepper; sugar
- Imitation cream, nondairy creamer, or coffee whitener
- Coffee or tea

**Dinner**
- Fruit cocktail, canned, ⅜ c
- Veal roast, 3 oz
- Potato, baked, med. 1
- Cauliflower, cooked, ⅜ c
- Bread, 1 slice
- Butter or margarine, 2 tsp
- 1 c reduced-fat milk
- Lemon ice, 1 c
- Imitation cream, nondairy creamer, or coffee whitener
- Coffee or tea
- Salt, pepper; sugar
Fluid Intake

1. Warn the patient about dehydration. Prescribe more fluids if the patient perspires heavily or is losing fluid for other reasons.
2. Ascertain the reasons for withholding fluid, such as for scheduled medical tests. Check the validity of the official request.
3. All concerned persons must ensure the patient receives plenty of fluids during the day and the night.

PROGRESS CHECK ON ACTIVITY 4

MULTIPLE CHOICE

Circle the letter of the correct answer.

1. The diet therapy indicated for a patient with calcium phosphate kidney stones is:
   a. low calcium and phosphorus, alkaline ash.
   b. high calcium and phosphorus, acid ash.
   c. low calcium and phosphorus, acid ash.
   d. high calcium and phosphorus, alkaline ash.

2. In planning a diet for a patient with calcium phosphate kidney stones, which of the following foods could you use in unlimited amounts?
   a. fruits
   b. meat
   c. milk
   d. cheese

MATCHING

Match the foods on the left to the type of restriction in an acid-ash diet:

3. Dried beans a. unrestricted
4. Potato b. partially restricted
5. Cranberry relish c. not allowed
6. Bananas

REFERENCES

CHAPTER 21

Nutrition and Diet Therapy for Cancer Patients and Patients with HIV Infection

Time for completion
Activities: 1 hour
Optional examination: 1/2 hour

OBJECTIVES

Upon completion of this chapter the student should be able to do the following:

1. Assess a client’s nutritional status using physical examination, diet history, and results of laboratory and clinical tests.
2. Identify factors that may alter nutrition.
3. Devise a plan for appropriate diet therapy based on client assessment, the stage of the disease, and its symptoms.
4. Identify the most common causes of malnutrition in patients with cancer or AIDS.
5. Describe measures to enhance food intake and retention.
6. Identify dietary modifications to increase amounts of needed nutrients.
7. Describe methods for the following alterations: modifying consistency, texture, and flavor suitable to the patient’s stage of illness and/or treatment; increase the total amount of nutrients; modifications compatible with the client’s social, cultural, and ethnic beliefs.

8. In conjunction with the oncology team (doctor, dietitian, pharmacist), implement a nutrition care plan to promote optimal nutrition.

9. Provide nutrition instructions and council to patient, family, and/or significant others of patients with cancer or AIDS.

10. Revise nutrition care plans as situations change.

Optional Objectives for Additional Study

1. Evaluate some unproven nutritional therapies often used by patients with cancer or HIV infections (refer to Chapter 12, Alternative Medicine).

2. Review the essentials of food-handling precautions used for all patients, but especially those with compromised immune systems.

3. Discuss foods and fluids that provide comfort during the terminal phase of cancer or AIDS, and the ethics of decisions sometimes described as “heroic measures.”

Glossary

**Adenocarcinoma:** a cancer that begins in cells that line the internal organs.

**AIDS (acquired immunodeficiency syndrome):** a deadly viral disease that destroys the body’s immune system by invading the helper T lymphocytes.

**ARC (AIDS-related complex):** the opportunistic infections that begin in a host when the immune system is compromised.

**Asthena:** lack of strength or energy, debilitation.

**B cells:** specialized lymphocytes that produce immunoglobulins. They originate in the bone marrow cells and involve many cells in the body in the immune response.

**Cachexia:** severe malnutrition and emaciation marked by anorexia, unintentional weight loss, loss of muscle and fat stores, anemia, and immunoincompetence.

**Candidiasis:** infection with the fungus of the genus Candida, appearing as whitish lesions in moist areas of the skin or inner mucous membranes.

**Carcinogen:** any substance that causes cancer.

**Carcinoma:** a cancer that begins in the skin or in tissue that lines or covers internal organs. Arises from the surface, glandular, or parenchymal epithelium.

**Cellular immunity:** specific acquired immunity in which T lymphocytes predominate. A cell-mediated response, they multiply rapidly, engulf, and digest antigens.

**Chemotherapy:** treatment with anticancer drugs.

**Dysgeusia:** distortion of the sense of taste.

**Gliomas:** primary intracranial tumors.

**HIV (human immunodeficiency virus):** the virus that replicates itself in the T cells and destroys the lymphocyte.

**Humoral immunity:** specific acquired immunity in which antibodies produced by B lymphocytes and plasma cells predominate. Genetically programmed to recognize antigens and destroy them.

**Hypogusia:** reduced taste.

**Kwashiorkor:** a severe protein deficiency disease.

**Leukemia:** neoplasm of the blood cells.

**Lymphoma:** cancer appearing in the lymph nodes, spleen, liver, and bones (Hodgkin’s).

**Marasmus:** a condition characterized by loss of body tissue and strength owing to lack of sufficient caloric intake over a prolonged period.

**Metastasis:** spread or transfer of cancer from one organ or body part to another not directly connected to the primary site.

**Opportunistic infections:** infections caused by nondisease-producing organisms when resistance has been decreased by surgery, illness, and other disorders.

**Palliative care:** care affording relief and comfort, but not cure, usually offered when the patient is terminally ill.

**Sarcoma:** any malignant tumor of primary tissues other than those listed in carcinoma definition.

**Staging:** determination of the extent of cancer by the use of exams and diagnostic tests.

**Stomatitis:** inflammation of the oral mucosa involving the lining of the inside of the cheeks, tongue, palate, floor of the mouth, and gums.

**T cells:** specialized lymphocytes in the immune response that originate from stem cells in bone marrow and migrate when mature to the thymus gland.

**Teratoma:** a cancer of mixed components.

**Xerostomia:** dry mouth.

Background Information

Cancer is a group of more than 100 different diseases. Cancer occurs when cells become abnormal and keep dividing without control or order. Most cancers are named for the type of cell or organ in which they begin (see Glossary). Screening for cancer includes physical examination, laboratory tests and procedures, and the use of imaging modalities to look at internal organs. The most common detection and diagnostic tools are CT (or CAT) scans, MRI, ultrasonography, endoscopy, and biopsy. Common tests include blood and urine tests, Pap smears, mammograms, fecal occult blood, and others as needed. Following the results of the screening, a determination is made of the size and extent of the cancer, and a treatment plan is developed. This process is called staging.
The nutritional status of the individual predicts tolerance and response to therapy. Individuals who do not lose weight have significantly longer survival time than those who do. Malnourished individuals are most susceptible to infection and less likely to tolerate or derive optimal benefits from therapy. Malnutrition is also an important issue in the quality of life of individuals diagnosed with cancer. Many studies indicate that more cancer patients die of malnutrition than from the disease.

Cancer and HIV infections share many similarities in the effects of malnutrition on the disease prognosis, progression, response to therapy, and the quality of life. Death in the individual with HIV syndrome is correlated with the degree of loss of lean body mass, and sustained weight loss is a predictor of progression to AIDS. Numerous studies indicate that malnutrition can predict death from AIDS.

There are myriad nutritional and metabolic changes characteristic of both cancer and AIDS. These changes are directly related to the body’s response to the disease, treatment methods, surgical procedures, and psychological and emotional responses of the individual. They will be discussed in detail in Activity 1.

A number of emotional factors contribute to nutritional status, such as depression, guilt, fear, denial, pain, conditioned aversions, and reaction to drugs. Loss of independence creates a major trauma.

Formidable challenges face care providers and caregivers of individuals who have cancer or HIV infections and AIDS. This chapter deals with the nutritional aspects of care.

**Progress Check on Background Information**

**TRUE/FALSE**

Circle T for True and F for False.

1. T F Marasmus is a condition characterized by loss of body tissue and strength due to lack of sufficient caloric intake over a prolonged period.
2. T F Kwashiorkor is a common, severe protein deficiency disease in the United States.
3. T F T cells are regular lymphocytes in the immune response that originate from stem cells in bone marrow and migrate when mature to the thymus gland.
4. T F B cells are specialized lymphocytes that produce immunoglobulins. They originate in the bone marrow cells and involve many cells in the body in the immune response.
5. T F Palliative care affords relief and comfort, but not cure, offered usually to terminally ill patients.
6. T F Staging is a process to develop a treatment plan based on the results of screening and determination of the size and extent of the cancer.
7. T F Many studies indicate that more cancer patients die of malnutrition than from the disease.
8. T F Loss of independence does not create a major trauma on nutritional status.

**MULTIPLE CHOICE**

Circle the letter of the correct answer.

9. Screening for cancer includes:
   a. physical examination.
   b. laboratory tests and procedures.
   c. use of imagining modalities to look at internal organs.
   d. all of the above.
10. Common tests for cancer include:
    a. blood and urine tests.
    b. pap smears.
    c. mammograms.
    d. fecal occult blood.
    e. all of the above.
11. The nutritional status of the cancer patient predicts:
    a. tolerance and response to therapy.
    b. susceptibility to infection.
    c. quality of life of individuals.
    d. all of the above.
12. Cancer and HIV infections share many similarities in the effects of malnutrition on:
    a. the disease prognosis and progression.
    b. response to therapy.
    c. the quality of life.
    d. loss of lean body mass and sustained weight loss.
    e. all of the above.

**ACTIVITY 1:**

**Nutrition Therapy in Cancer**

Nutrition therapy for cancer patients is highly individualized, depending on the body’s response to the disease, the site of the cancer, the type of treatment, and the specific physical and psychological responses of the patient. Myriad metabolic and nutritional changes are characteristic of nearly all cancer patients. These include fatigue, asthenia, cachexia, anorexia, anemia, fluid and electrolyte imbalances, hypogusiosis or dysgusiosis, xerostomia, dysphagia, esophagitis, malabsorption, stomatitis, nausea and vomiting, fever, altered metabolic rate, negative nitrogen balance, and edema. Infection is not uncommon.
THE BODY'S RESPONSE TO CANCER

The specific type of cancer, and the disease process itself, has profound effects on the entire body system and cause primary nutritional deficiencies. Some examples of the body's responses to several types of cancer are given in the following paragraphs.

Cancers occurring in the gastrointestinal tract or adjacent tissue cause difficulty in ingestion and use of nutrients. Obstruction curtails intake, and malabsorption interferes with digestion of fats and fat-soluble vitamins, especially vitamin D, which in turn leads to decreased metabolism and absorption of calcium, causing osteomalacia. Abdominal tumors may cause fistulas to develop, leading to bypass of the small intestine and consequent malabsorption. Adenocarcinoma of the colon leads to severe electrolyte imbalance. General malabsorption also contributes to fluid and electrolyte imbalance. Vomiting and diarrhea result in loss of water-soluble vitamins. Intestinal malignancies contribute to hypokalemia.

Cancer of the bone, or breast cancer with metastasis to the bone, also lead to hypokalemia. Cancer within the thyroid gland will result in hormonal imbalances. Pancreatic cancer and resulting pancreatectomy lead to the loss of digestive enzymes and diabetes mellitus.

Anorexia, the most common symptom, is related to altered metabolism, type of treatment, or emotional distress. Increased hemolysis, bleeding of lesions, fistulas, and malabsorption of nutrients needed for hemoglobin formation (iron, protein, folic acid, vitamin B₁₂, and vitamin C) lead to severe anemia.

THE BODY'S RESPONSE TO MEDICAL THERAPY

Current cancer therapy takes three major forms: surgery, radiotherapy, and chemotherapy. Sometimes they are used in combination. Nutrition support for these modalities enhances chances of success of the treatments. See Table 21-1.

Surgery

Surgical procedures pose special nutritional problems depending on the site. For example, head and neck surgery or resections greatly affect intake, requiring different feeding methods, feeding intervals, and modifications in oral food preparation.

Nutrition goals for surgical procedures include the following:

1. Provide optimal nutrition preoperatively and maximum support postoperatively to facilitate the healing process and overall body metabolism.
2. Provide specific modifications of the nutrients according to the surgical site and organ function involved.

Radiotherapy

Radiation therapy significantly influences nutritional status, depending on the site and intensity of the treatment.

1. Radiation to the head and neck or esophagus affects oral mucosa, salivary secretions, taste sensation, and sensitivity to temperature and texture of food. The
nutrition plan will include the alterations necessary to overcome these effects.

2. Radiation to the abdomen may produce loss of intestinal villi and absorbing surfaces, vascular changes, ulcer formation, inflammation, obstructions, strictures, and curtailment of food (from anorexia and nausea). Many alterations and modifications in the nutrition plan will be needed to provide aggressive nutrition therapy to these patients.

**Chemotherapy**

Chemotherapy has the same effect on normal cells as they do on cancer cells. This becomes most apparent in changes in the bone marrow, hair follicles, and GI tract.

1. Bone marrow effects include interference with production of both white and red blood cells, producing anemia, infection, and bleeding.
2. GI effects include nausea, vomiting, stomatitis, anorexia, ulcers, and diarrhea.
3. Hair follicle effects are body hair loss and alopecia.

**PLANNING DIET THERAPY**

Table 21-2 summarizes the guidelines in planning diet therapy for cancer patients. The objectives of diet therapy are to do the following:

1. Meet the increased metabolic demands of the disease and prevent catabolism of the body tissues.
2. Alleviate symptoms of the disease and its treatment by adapting the food and feeding methods to the individual.

The basis for planning care includes:

1. Thorough personal nutrition assessment
2. Vigorous nutrition therapy to maintain good nutritional status and support
3. Revision of care plan as individual status changes

Major eating problems, as discussed earlier, are:

1. Appetite problems include anorexia caused by systemic effects of cancer and treatment modalities, depression, anxiety, and stress. These problems lead to cancer cachexia.
2. Mouth problems caused by stomatitis, sore mouth, dysgeusia, hypogeusia, low salivary production, and candidiasis often occur.
3. Gastrointestinal problems, in the upper intestine, include nausea, vomiting, bloating, postgastrectomy dumping syndrome, and so on. In the lower intestine, diarrhea, constipation, lactose intolerance, and so on occur.

Each of the following factors is related to tissue protein synthesis and energy metabolism. Increased needs for all major nutrients, including fluids, are based on the demands of the disease and treatment. Individual needs may vary, but the general guidelines are the same.

1. Energy: Increase total energy value to prevent excessive weight loss and meet increased metabolic demands. An adult in good nutritional status requires less than 2000 kcalories per day for maintenance. A severely malnourished patient may require 3000 to 4000 kcalories. Carbohydrates should supply most of the energy intake with fat restricted to about 30% of total calories.
2. Protein: Provide additional amino acids and nitrogen for healing and tissue regeneration. An adult in good nutritional status requires less than 80–100 g for maintenance and anabolism. A malnourished patient will need more, depending on individual requirement and treatment(s).
3. Vitamins and minerals: Key vitamins and minerals control energy, protein, and amino acid metabolism. Review Chapters 2 through 6 for specifics. Some characteristics are given here. The B-complex vitamins are coenzymes in protein and energy metabolism. Vitamins A and C are components of tissue structure. Vitamin C is also an antioxidant and functions in immune and enzyme reactions. Vitamin A functions in cell differentiation and protective immunity. Vitamin D has a vital role in the metabolism of calcium and phosphorus in bone and blood serum. Vitamin E protects the integrity of cell walls. Many minerals have structural and/or enzymatic roles in metabolic and tissue building processes.
4. Water is second only to oxygen as the most important nutrient in the human body, and maintenance of the fluid and electrolyte balance is especially crucial in cancer. Review Chapter 6 for the functions and distribution of body water.

Many individuals with cancer or AIDS subscribe to unproven nutritional therapies, from personal beliefs that it will help them take control of their disease, on the advice of family and friends, or information found on Web sites and other media. Herbal remedies, macrobiotic diets, metabolic therapy, and thymus gland extracts are often encountered by the healthcare professional when taking diet histories. Megavitamin and mineral therapies (taking 10 times the RDAs/DRIs) are among the most often used. Vitamins that are popular are A, C, B12, and thiamine, and the minerals iron, zinc, and selenium.

These therapies and others can be harmful, and more details are described in Chapter 12 on alternative medicine.

Special considerations in feeding a cancer patient include the following:

1. Do not provide drinks during meal time if the patient experiences nausea. Separate liquid from solid foods.
### TABLE 21-2  General Guidelines for Nutrition Therapy

There are no exact rules for diets for the cancer patient because each is highly individualized. The general guidelines in the following table will be helpful in planning optimal nutrition for a patient, based on the alterations that you find when you assess the needs of the individual.

<table>
<thead>
<tr>
<th>Alterations</th>
<th>Appropriate Interventions</th>
</tr>
</thead>
</table>
| Pain, nausea, decreased taste sensations, diarrhea, fever, decreased appetite, anorexia | • Modify consistency as liquids may be difficult to swallow; soft foods are better tolerated. Liquids can be thickened to semisolid consistency.  
• Wait one or two minutes between bites.  
• Cool foods are better tolerated.  
• Avoid spicy, acidic, or irritating foods. |
| Nausea, vomiting | • Offer foods cold or room temperature and soft, salty foods as tolerated.  
• No greasy, spicy, or rich foods.  
• Separate intake of liquids from solids by at least an hour.  
• Offer crackers or dry toast.  
• Offer high-protein, high-calorie milkshake supplements.  
• Use antinausea medications before meals. |
| Constipation | • Offer high-fiber foods, including fresh fruits and vegetables.  
• Offer extra fluids.  
• Provide stool softeners when needed. |
| Diarrhea, malabsorption | • Provide a low-residue diet and supplements.  
• Offer small frequent feedings at room temperature.  
• Avoid gas-forming, fatty, or high-lactose foods; citrus fruits; alcohol; caffeine; and caffeine-containing beverages.  
• Use soy supplement formulas.  
• Provide foods high in sodium and potassium (bananas, potatoes, bouillon, Gatorade, etc.).  
• Provide foods high in soluble fiber (applesauce, oatmeal, cream of wheat, others).  
• Provide 8 c fluid if tolerated.  
• Administer antidiarrheal medications.  
• Provide multivitamin supplements. |
| Fever | • Increase fluid volume.  
• Use refrigerated foods.  
• When planning the diet, include the patient, his or her family members, caregivers, and others who may be able to help with selection of allowed foods. Remember to take into account cultural, ethnic, and religious beliefs. |

**Source:** Adapted from Wilkes, G. M. (1999). Cancer and HIV nutrition (2nd ed.). Sudbury, MA: Jones and Bartlett Publishers.
2. If the patient has diarrhea, avoid the following:
   a. Vitamin C supplements in high dosage
   b. Laxative teas
   c. Foods containing sorbitol such as sugar-free candy and gums
   d. Dairy products rich in lactose
   e. Caffeine

3. If the patient has a decreased appetite, do not recommend large meals.

4. If the patient has oral thrush, avoid the following:
   a. Salty, hot, and/or spicy foods
   b. Acidic foods such as citrus fruits, tomato-based products, vinegar or vinegar-based foods

5. If the patient has difficulty in swallowing, avoid foods that are difficult to swallow. Examples include sticky foods such as peanut butter.

6. If a patient is insulin resistant, avoid a low-fiber diet.

7. If the patient experiences a change in taste sensation, do not use oral supplements in metallic cans.

**NURSING IMPLICATIONS**

The effectiveness of cancer treatments and patient's subsequent recovery depend in large part upon adequate nutrition. Both are affected by nutrition intake and utilization.

1. Malnutrition in a cancer patient is not inevitable. Most patients can be adequately nourished, if properly planned and executed nutrition therapy is provided.

2. Be aware that nutrition therapy must be proactive. Early assessment, intervention, and continuing preventive measures to prevent malnutrition are mandatory.

3. Nutrition therapy is designed for specific physical and psychological needs and is highly individualized, depending upon the response of each body system to the disease and treatment modality.

4. Nutrition care plans are patient centered: patients need to have some control in planning during disease stages and therapy effects.

5. Anticipate psychosocial situations that relate to appetite, various foods, drug effects, lifestyle, and beliefs of the client.

6. Provide the patients with information regarding symptoms they are experiencing, actions of their drug regimes, and mouth care tips they can do themselves.

7. Make a thorough assessment of energy, protein, electrolyte, fluid, and micronutrient needs of the patient to use as a baseline for planning diet.

8. Nutritional assessment includes physical examination, lab measurements (albumin, lymphocyte count, CBC, nitrogen balance, others), past medical history, present dietary intake (24-hour recall), and any other factors affecting intake.

9. Make revisions in the patient's diet as situations change.

10. Encouragement and support are very helpful. These have a positive effect on a patient's emotional status. They denote caring, comfort, and concern. Emphasize eating to get well, and health and wellness instead of illness.

11. Investigate the use of enteral and/or parenteral methods of feeding if they become necessary. Oral intake is preferred but may not be feasible in some cases.

12. Client education, with the nurse either as the primary teacher or as support teacher in a team effort, is effective in gaining desired goals.

13. Frequent follow-up teaching is desirable.

**PROGRESS CHECK ON ACTIVITY 1**

**FILL-IN**

1. Individualized nutrition therapy for cancer patients is dependent on:
   a. 
   b. 
   c. 
   d. 
   e. 

2. Name five nutritional changes characteristic of cancer patients:
   a. 
   b. 
   c. 
   d. 
   e. 

3. Nutrition goals for surgical procedures include:
   a. 
   b. 
   c. 

4. The basis for planning diet therapy for cancer patients includes:
   a. 
   b. 
   c. 

5. Three major effects of chemotherapy on the body are:
   a. 
   b. 
   c.
6. Many individuals with cancer or AIDS subscribe to unproven nutritional therapies because of:
   a. 
   b. 
   c. 

7. Three nutritional factors that will improve protein synthesis and energy metabolism are:
   a. 
   b. 
   c. 

8. Three major problems are encountered when planning diets for cancer patients. To what factor(s) are these due?
   a. Appetite problems due to 
   b. Mouth problems due to 
   c. GI problems due to 

9. For each of the alterations listed below, supply at least three appropriate interventions to boost nutritional intake:
   a. decreased appetite, anorexia 
   b. stomatitis, sore mouth 
   c. nausea, vomiting 
   d. dysphagia 

MULTIPLE CHOICE
Circle the letter of the correct answer.

10. An adult in good nutritional status requires about
    a. 1000 kcalories per day for maintenance
    b. 1500 kcalories per day for maintenance
    c. 2000 kcalories per day for maintenance
    d. 2500 kcalories per day for maintenance

11. An adult in good nutritional status requires about:
    a. 40 to 60 grams of protein for maintenance and anabolism
    b. 60 to 80 grams of protein for maintenance and anabolism
    c. 80 to 100 grams of protein for maintenance and anabolism
    d. 100 to 120 grams of protein for maintenance and anabolism

12. Megavitamin and mineral therapies are among the most often used unproven nutritional therapies. Which of these represents a megadose of vitamin therapy?
    a. 2 times RDA/DRI
    b. 5 times RDA/DRI
    c. 10 times RDA/DRI
    d. 20 times RDA/DRI
    e. none of the above

TRUE/FALSE
Circle T for True and F for False.

13. T F The specific type of cancer and the disease process itself have profound effects on the entire body system and causes primary nutritional deficiencies.

14. T F The development and progress of the disease cancer do not cause primary nutritional deficiencies.

15. T F Hypokalemia can be attributed to intestinal malignancies, cancer of the bone, or breast cancer with metastasis to the bone.

16. T F Breast cancer can be caused by nutritional deficiency.

17. T F Cancer within the thyroid gland will result in hormonal imbalances.

18. T F Pancreatic cancer and resulting pancreatectomy lead to the loss of digestive enzymes and diabetes mellitus.

19. T F Surgical procedures do not pose significant nutritional problems to the cancer patient.

20. T F Radiation therapy significantly influences nutritional status, depending on the site and intensity of the treatment.

21. T F Nutrition plans for patients with radiation therapy usually do not require aggressive nutrition therapy.

22. T F Chemotherapy has the same effect on normal cells as they do on cancer cells.

23. T F Anorexia due to systemic effects of cancer and treatment modalities, depression, anxiety, and stress usually leads to cancer cachexia.

24. T F Increased total energy value prevents excessive weight loss and meets increased metabolic demands.

25. T F Key vitamins and minerals control energy, protein, and amino acid metabolism.

26. T F The B-complex vitamins are coenzymes in protein and energy metabolism.

27. T F Vitamins are not components of tissue structure.

28. T F Many minerals have structural and/or enzymatic roles in metabolic and tissue-building processes.

29. T F Maintaining fluid and electrolyte balance is especially crucial in cancer.

30. T F When taking diet histories, healthcare professionals usually don’t encounter the patient’s self-prescribed remedies such as macrobiotic diets or metabolic therapy.
31. T F Both vitamin and mineral megadoses are safe at high levels as they are essential nutrients.

32. T F The effectiveness of cancer treatments and patient’s subsequent recovery depend in large part upon adequate nutrition intake and utilization.

33. T F Most cancer patients cannot be properly nourished, even when carefully planned and executed therapy is provided.

34. T F Nutrition therapy for all cancer patients is basically the same.

35. T F Nutrition care plans are patient centered; patients need to have some control in planning during disease stages and therapy effects.

36. T F Psychosocial situations are not determinant factors in nutrition therapy.

37. T F Thorough assessment of energy, protein, electrolyte, fluid, and micronutrient needs of the patient should be used as a baseline for planning diet.

38. T F Revisions in the patient’s diet as situations change is essential in nutrition therapy.

**ACTIVITY 2:**

**Nutrition and HIV Infections**

**BACKGROUND**

AIDS patients are at high risk for neoplasms. The oncology team is likely to also be involved in the treatment of patients with HIV infection.

Since the discovery of HIV infections and consequent development of AIDS in the early 1980s, much has been learned about retroviruses, immune function, and opportunistic infections. Although many clinicians and HIV specialists and researchers did not recognize the important role that nutrition played in the process, today we know that nutrition has a primary role in the process, progression, and treatment of HIV disease.

There is no dormant phase in HIV infection. Once the virus enters the body, it settles into a pattern in the host cells, replaces the immune system cells, and continues to proliferate. The higher the viral load in the body, the quicker the immune dysfunction occurs and the disease progresses.

Nutrition and immune function are intertwined. Maintenance of optimal nutritional status is not only essential for body stores, but also to the support of medications and other therapies that are used. Food and nutrient interactions with the antiretroviral medications are common, making it difficult for a patient to adhere to the medical regime. However, improvement in nutritional status, especially lean body mass, improves well-being and quality of life, despite the level of HIV in the blood.

The stress response of the body to the immune system’s efforts to protect the body is a continuous process, resulting in loss of lean body mass, chronic inflammation, and hypermetabolism. The stress response is also marked by loss of appetite and reduced nutrient intake. Specific factors are discussed later in this chapter.

The clinical course of HIV infection leading to full-blown AIDS varies with each individual. However, the disease goes through three distinct phases: the primary HIV infection and extended incubation period, in which the person is asymptomatic; the second stage in which other illnesses manifest, called the AIDS-related complex (ARC); and the third stage or terminal AIDS.

**Primary Stage**

Sometimes the person has mild flulike symptoms one or two weeks after exposure and infection, while in others this may not occur. During this stage, the person appears well. This incubation period, while the person is asymptomatic, may last for 8–10 years. It is a crucial period during which the virus grows and multiplies rapidly. Optional nutritional status is essential during this phase, as well as in later stages.

**Second Stage**

In this stage a group of opportunistic illnesses begin. The HIV infection has killed many of the host’s T cells and severely damaged the immune system. Normal infections that usually would not harm the host take root and grow. Symptoms during this period include persistent fatigue, candida (thrush), night sweats, fever, unintentional loss of 10 or more pounds of weight, skin rashes, severe headaches, cough, sore throat and mouth, shortness of breath, and bruises on the skin. Aggressive nutrition therapy during this crucial stage delays the progression of infections.

**Final Stage**

The terminal stage of HIV infection, or AIDS, is marked by declining T lymphocyte production from the normal level of >1000/mm³. When the count drops to between 200–500/mm³, diseases such as tuberculosis and Kaposi’s sarcoma develop. Below 200/mm³, lymphomas, pneumonocystitis, carnii pneumonia, protozoa, and parasites overwhelm the weakened immune system and death follows.

Death in the end stages of HIV syndrome is correlated with the degree of loss of lean body mass. Numerous studies have shown that sustained weight loss is a predictor of progression to AIDS and can predict death from the disease.
BASIC ROLE OF NUTRITION IN HIV INFECTIONS

The goals of nutrition therapy in the care of the AIDS patient are to do the following:

1. Delay the progression of infections and improve the patient’s immune system.
2. Prevent the wasting effects of HIV infection—severe involuntary malnutrition and weight loss.
3. Prevent opportunistic diseases.
4. Recognize infections early and provide rapid treatment for an incompetent immune system, which includes infections and cancer.
5. When nutrient needs of HIV/AIDS patients cannot be met by a normal diet, nutrition intervention such as a high-protein, high-calorie diet, and a multivitamin/mineral supplement may be necessary. Low-fat lactose-free oral supplements may be better tolerated than higher-fat supplements.

With the use of protease inhibitors, persons with HIV infections have fewer symptoms and complications from the virus, making nutrition of great importance in stage one. A balanced diet high in protein and calories, modified fat intake of 30% of calories from fat, and daily vitamin and mineral supplements is essential. Maximum nutrient intake enhances immune cell function, delaying the later stages and allowing the person to have a better quality of life.

In the second stage as the disease is progressing, weight loss and malnutrition are prevalent. The body cell count reduction increases the risk of infections and early death, and fatigue and weakness decrease quality of life. These conditions increase the need for extra nutrients and require the whole spectrum of nutritional support. Enteral and parenteral feedings should be considered. Medications to alleviate severe pain, diarrhea, anorexia, nausea, and vomiting should be given. Small, frequent feedings high in quality protein are better tolerated than full meals.

In the last stages, or full blown AIDS, the effects on the GI, neurologic, and pulmonary systems as well as the side effects of medications and altered metabolism present great challenges for both healthcare providers and patients. These complex conditions impair nutritional status and become more difficult to manage as the disease progresses. When the patient is no longer able to eat, enteral tube feedings or parenteral feeding may be used. Ultimately, however, ethical questions about continued feeding efforts must be faced. Answers lie with the patient as long as possible, and with his or her family. The oncology/AIDS team, including physician, nursing personnel, and clinical dietitian, along with the patient and family face these decisions together.

GENERAL GUIDELINES FOR NUTRITION THERAPY IN HIV INFECTIONS

Anorexia and cachexia are the major clinical nutrition alterations in HIV infections and affect all clients with advanced HIV infection or cancer. Cachexia is progressive and occurs despite adequate and supplemental nutrition. It profoundly affects the quality of life and is associated with mortality.

Characteristics of cachexia include anorexia, weakness, early satiety, nonintentional weight loss, loss of muscle and fat stores, decreased mobility and physical activity, nausea, vomiting, dehydration, edema, chronic diarrhea or constipation, pain, fever, night sweats, dysphagia, candidiasis, malabsorption, and dementia. These symptoms have a profound impact on nutrition.

Individual factors that influence food intake include the following:

- Income: Availability of food and the cost of fresh food
- Psychosocial factors: The client’s beliefs about food, learned food aversions, and social status.
- Dependency issues: The family may support and encourage the client, or they may become alienated.
- Psychological factors: Depression, loss of self-care ability, guilt, low self-esteem, facing the diagnosis of AIDS, and end-of-life measures.
- Ethnic and cultural considerations: HIV/AIDS is poorly understood by many clients not born in the United States, or immigrants. Language barriers present a problem with presenting nutrition and safety measures.

Table 21-1 in Activity 1 (General Guidelines for Nutrition Therapy) is relevant for planning diet for the person with HIV infections. Remember that the diet must be highly individualized. Nutrition interventions specific to the AIDS patient are given in Table 21-3.

NUTRITION IN TERMINAL ILLNESS

Decisions involving nutrition and hydration in terminal patients are becoming more frequent. When a patient is no longer able to eat, enteral or parenteral feedings may be administered. Ethical questions arise concerning this decision: how long to continue the feedings? This is important when the patient is no longer able to make such decisions. In the past, this was a medical issue and the physician providing treatment for a particular patient made the final decision.

Recently, many controversies have developed relating to these issues. In view of this, many states have passed laws requiring hospitals to develop and implement protocols that the care provider team must follow if such medical conditions exist. The patients may or may not be
TABLE 21-3 Nutrition Interventions for AIDS Clients

Careful and thorough assessment and monitoring of the patient’s diet by the AIDS team is essential. Finding the cause of underlying malnutrition allows for more appropriate diet therapy.

Assessment of nutritional needs:
- Diet history, past and present, including any self-prescribed nutrition regimes, drug- or alcohol-related medical problems
- Calculation of nutrient intake
- Anthropometric measurements
- Food allergies, intolerances, cultural patterns
- Socioeconomic status, dental health, weight history
- Weight changes, appetite changes
- GI symptoms
- Medication list
- Laboratory reports

In addition to information given in Table 21-2 (Guidelines for Nutrition Therapy), some practical applications specific to AIDS patients are listed here.

- Alteration: nausea
  Eliminate strong odors, reduce fat intake, eliminate foods such as fried foods, potato chips, full fat ice cream, fatty beef products, peanuts, doughnuts, and pastries. Substitute foods such as pretzels, saltines, baked or broiled chicken or fish, fat free cookies, sherbets, and sorbets.

- Alteration: diarrhea
  1. Oral feedings preferred, may not have to resort to parenteral feedings.
  2. Diet should be high in soluble fiber, low in lactose, fat, and caffeine.
  3. Avoid dairy products, cow’s milk. Try lactose-reduced milk or OTC lactaid tablets, most can tolerate these products.
  4. Offer bananas, rice, applesauce, and tea (commonly called the B.R.A.T. diet), and white toast for a limited time (2–3 days) as this is inadequate nutrition.
  5. Foods rich in soluble fiber help to make the stool firmer. Canned pears, peeled and cooked sweet and white potatoes, cream of wheat, and oatmeal are good sources.

If diarrhea is intractable, the use of medium chain triglycerides, elemental formulas (predigested and hydrolyzed products), and fat-soluble vitamins in water-soluble form may be needed.

- Alterations: thrush and dyspnea
  1. The diet should be soft, low acid, low sodium, served at room temperature. Use foods that do not require significant chewing.
  2. Use foods such as macaroni and cheese, yogurt, vanilla pudding, tuna salad, mashed potatoes, rice, noodles, and cream soups.
  3. Add gravies or sauces to any ground meats.
  4. Use straws for liquid (bypasses a sore mouth).

Use of Supplements
The use of supplements should be evaluated. The following is a brief overview of the most frequently used feedings.

- Oral (enteral)
  Select one that is balanced in macronutrients (CHO, protein, fat) and calorie-dense (provides the most calories in the smallest volume). When using these supplements, assure adequate hydration with extra water and fluids.

  The supplement should be high in protein, CHO, and fat. The fat should be in the form of medium chain triglycerides (MCT). It should contain soluble fiber, be lactose free, and provide 100% of the U.S. RDA/DRI for vitamins and minerals.

  Complete formulas are preferred. Enteral formulas have been developed to target specific problems by reducing the problems of malabsorption.

  Some oral formulations containing increased amounts of macronutrients include, but are not limited to, these brand name products:
  Ensure plus, Ensure HN, Isocal, Advera, Vivonex, and Boost plus. They come in a variety of flavors and meet all the requirements.

  Other preparations that can be obtained at the grocery store are Instant Breakfast, eggnog, and others. Check the labels carefully.

- Tube feedings
  Tube feedings can range all the way from blenderized foods prepared from whole foods to commercial formulas.

  Several complications can occur, such as diarrhea, fluid and electrolyte imbalances, and hyperglycemia. Blenderized home formulas may not contain balanced nutrients. There is also concern about the safety in handling and storage problems. In the clinical setting, commercial formulas are preferred.

  Tube feedings should be monitored closely and frequent lab assessments made.

- Total parenteral nutrition (TPN)
  TPN is used when other methods are not suitable. It contains glucose, amino acids, vitamins, trace elements, and often insulin. MCT is administered separately. Because it is hypertonic, it requires frequent monitoring of the blood.

  TPN presents an ethical dilemma. It is an invasive procedure, usually administered in the left subclavian vein. It is contraindicated in clients with advanced disease for whom there is no disease reversal.

involved in this process, depending on their medical status. The legal requirements vary from state to state. This book is not the proper forum to discuss such details. The Internet is the best resource for an interested party to obtain more information.

ALTERNATIVE NUTRITION THERAPIES

As is true of other incurable diseases, many patients will try any alternative that is offered to them, hoping for a miracle. Often cited in treatment for AIDS are alternative nutrition regimes, supposed to boost the immune system, increase enzyme production, prevent further deterioration, create a hostile internal condition to keep the virus from spreading, and restore balance and harmony to the system, to name a few so-called benefits.

Popular among the many such regimes offered is the use of megadoses of vitamin and mineral supplements. For instance, vitamins A, C, and \( B_{12} \) and the minerals zinc and selenium are said to strengthen the immune system and enable it to overcome the ravages of the disease. The opposite effect is more likely: excess vitamin C often causes rebound scurvy when discontinued; vitamin A, zinc, and selenium are very toxic when taken in excess over long periods. Excess supplements suppress immune function instead of strengthening it. Laetrile is still around and still touted as a cure for AIDS, as it has been for cancer. Laetrile has never been proven to be beneficial in the treatment of chronic disease. Proponents of laetrile for AIDS treatment also recommend a strict vegan diet, which is totally inadequate in many nutrients and excessive in others. The macrobiotic diet, a longstanding item in the quackery arsenal, produces protein-calorie malnutrition, the opposite effect of what is needed for the AIDS patient.

Many alternative diets, herbs that are toxic to the body, and some supplements are of doubtful value (see Chapter 11, Dietary Supplements, and Chapter 12, Alternative Medicine).

It is important for the nurse to be aware of self-prescribed diets and practices of clients. These practices should be entered as part of the diet history. Develop an understanding of various alternatives, as they are a part of the practitioner’s health concerns of each client. Try to provide patients with information regarding the potential harm of self-prescribed nutrition therapies without alienating them. Keep your lines of communication open.

SPECIAL NUTRITIONAL CARE FOR CHILDREN WITH AIDS

Because HIV infections and AIDS are wasting diseases, the child will exhibit the problems and complications similar to those found in adults. Additionally, failure to thrive and impaired brain growth will occur.

The progression and manifestation differ somewhat from adults. The Centers for Disease Control (CDC) developed a system that separates them into four categories based on age, signs, symptoms, or diagnosis.

The severe malnutrition that occurs in children with AIDS affects not only their present condition but also their future growth and development. Nutritional needs are 50%–100% above the RDA/DRI requirements of their age group. Because acute anorexia is also present in children, achieving this necessary increase is a very difficult task. One-on-one support and attention are helpful and needed. Some suggestions for feeding children include the following:

1. Infants: Use kcal-dense formulas, supplements of MCT, or glucose polymers. If the infant is lactose intolerant, as many infants and children with AIDS are, use soy-based formulas and supplements.

2. Children: Use any supplements high in kcal and protein that are tolerated. Use added fats and nutrient-dense snacks. If the child is lactose intolerant, use lactose-free soy milk and/or use Lactaid (a commercial preparation) added to milk products to improve their digestibility. Alternative feeding methods may be considered when a child is unable to eat. Maintain optimal hydration fluids, using available commercial products such as Pedialyte, Gatorade, and so on. Smaller feedings spread throughout the day are usually better accepted. Big doses of patience and love by the person(s) doing the feeding are necessary and increase the child’s acceptance. Allow the child to make some food choices. Make food attractive and fun.

3. A word of caution: Although sanitation is very important for all patient feeding, it becomes more so with children who have AIDS. They should never receive unpasteurized products; babies should not be fed directly from the open jar; fruits and vegetables should be peeled and cooked; meats should be well cooked and tender; and all eating utensils should be sanitized before and after using. These precautions are used to avoid bacterial contamination. Salmonella is a particular problem, and it can be deadly in a child who is already compromised.

FOOD SERVICE AND SANITARY PRACTICES

Individuals who serve foods to AIDS patients must be reminded not to discriminate against them. All standard sanitation procedures implemented in the facility against cross-contamination should be complied with whether the patient carries AIDS or any other transmissible disease. For example, articles contaminated with an AIDS patient’s emesis, feces, urine, and blood must be decontaminated before being returned for cleaning, as would be the case with any other contaminated patient’s discharge (“universal precautions”).
Because of impaired immune systems, AIDS patients are unable to fight food-borne infections, which cause severe diarrhea and vomiting. They can be fatal to anyone with HIV infections. The patients must be protected from infection. Food-borne infections occur more frequently among people with HIV infections than in other people. If a facility is not practicing sanitary food preparation, service, and storage, it must do so. Improper food handling is a primary source of bacterial contamination, and personnel should be very careful to follow state and federal laws. Most facilities that serve food are regulated by state and federal laws to implement acceptable food safety and sanitation practices, and these practices become crucial to those serving patients with AIDS.

Because many foreign countries do not have as strict guidelines for food handling, it is better to avoid using imported foods and use only those grown and distributed in the United States. All fresh fruits and vegetables must be thoroughly washed before using. Use only pasteurized products and never serve raw eggs, meat, or fish to the patient. Do not allow such products to be brought in by family and friends. Explain to them the reasons for these rules and the consequences. It is also prudent to inspect any food items being brought from outside the facility before the patient receives them.

**NURSING IMPLICATIONS**

1. Be supportive and nonjudgmental.
2. Use whatever feeding methods or type of feeding that is most effective.
3. Consider the psychological aspects of feeding: some patients may be willing to fight as long as possible; others are not willing to fight at all.
4. Take advantage of times when the client is pain free to offer food. Feed them any time they feel hungry. Serve foods that require little chewing.
5. Make certain that the environment is free of odors, debris, and clutter and that the tray is attractive and palatable.
6. Serve small, frequent meals of high-protein, high-calorie, nutrient-dense foods. Offer nutrient-dense snacks frequently. Consult with the RD on your team for tips or planning if you need assistance. Be sure to inform dietary personnel if changes are needed.
7. Assistance with eating (buttering, cutting, dipping, and unwrapping) may be needed. Observe the patient to determine if help is wanted or resented.
8. Systemic oral hygiene and topical analgesics should be used as necessary.
9. Encouragement from health personnel is as necessary as that from friends and relatives, so be generous.
10. Be aware of any self-prescribed nutrition therapy and practices of the client. Many of the herbs used are dangerous and have toxic side effects.

11. Educate the patient and all caregivers: use the team’s dietitian as a primary teacher or as a consultant for evaluation of your teaching plan.
   a. Teach basic principles of nutrition. Use the food guide pyramid for instructions.
   b. Set realistic goals.
   c. Assess financial resources and living arrangements. Obtain a list of community resources, such as food banks and others.
   d. Adapt foods to differences in lifestyle, cultural and ethnic background, religion, and income.
   e. Assess the client’s educational level (can they read, what is their primary language, etc.).
   f. Review safe handling practices.
   g. Include appointments for follow-up teaching in your plan if client will go home between hospital visits.

**PROGRESS CHECK ON ACTIVITY 2**

**MULTIPLE CHOICE**

Circle the letter of the correct answer.

1. The stress response to HIV infection is marked by:
   a. loss of appetite and reduced nutrient intake.
   b. loss of lean body mass.
   c. chronic inflammation.
   d. hypermetabolism.
   e. all of the above.

2. Alternative nutrition regimes are supposed to:
   a. boost the immune system.
   b. increase enzyme production.
   c. prevent further deterioration.
   d. create a hostile internal condition to keep the virus from spreading.
   e. restore balance and harmony to the system.
   f. all of the above.

3. T lymphocyte production in HIV infection will drop from normal levels to:
   a. less than 1000/mm3.
   b. less than 800/mm3.
   c. less than 600/mm3.
   d. less than 200/mm3.
   e. none of the above.

**FILL-IN**

4. The four goals of nutrition therapy for AIDS patients are:
   a. 
   b. 
   c. 
   d. 

   a. 
   b. 
   c. 
   d. 

   a. 
   b. 
   c. 
   d. 

   a. 
   b. 
   c. 
   d.
5. Name the three distinct phases of HIV infections. Include manifestations of each phase:
   a. Phase 1: __________________________
      Manifestations ______________________
   b. Phase 2: __________________________
      Manifestations ______________________
   c. Phase 3: __________________________
      Manifestations ______________________

6. For each of the goals listed, supply an appropriate nutritional intervention.
   a. Stop weight loss. _____________________
   b. Rebuild lean body mass. _______________
   c. Minimize malabsorption. _______________
   d. Manage the specific problems related to nutrition. _______________
      i. Anorexia __________________________
      ii. Nausea and vomiting _______________
      iii. Severe weight loss ________________
      iv. Oral or esophageal lesions __________
      v. Infection and sepsis ________________

7. List five nursing responsibilities pertaining to feeding AIDS patients:
   a. _________________________________
   b. _________________________________
   c. _________________________________
   d. _________________________________
   e. _________________________________

8. Describe the general sanitation techniques to be used by dietary and nursing staff for the protection of staff and patient. ________________________________

TRUE/FALSE
Circle T for True and F for False.

9. T F Once the HIV virus enters the body, it settles into a pattern in the host cells, replaces the immune system cells, and continues to proliferate. The higher the viral load in the body, the quicker the immune dysfunction occurs and the disease progresses.

10. T F Nutrition and immune function are intertwined.

11. T F Improvement in nutritional status, especially lean body mass, improves well-being and quality of life, despite the level of HIV in the blood.

12. T F Because the primary stage of HIV infection may last for 8–10 years, it is not essential to have optimal nutritional status during this phase.

13. T F Aggressive nutrition therapy during the second stage delays the progression of infections.

14. T F At the terminal stage of HIV infection, or AIDS, the patient has no T lymphocyte production.

15. T F Sustained weight loss is not a predictor of progression to AIDS.

16. T F A balanced diet high in protein and calories, modified fat intake of 20% of calories from fat, and daily vitamin and mineral supplements is essential.

17. T F Medications to alleviate severe pain, diarrhea, anorexia, nausea, and vomiting should not be given to HIV or AIDS patients, because they may be addictive.

18. T F In the last stage, or full-blown AIDS, the patient may no longer be able to eat, and enteral tube feedings or parenteral feeding may be necessary.

19. T F Anorexia and cachexia are the major clinical nutrition alterations in HIV infections and affect all clients with advanced HIV infection or cancer.

20. T F When nutrition administration becomes invasive and painful, or when the patient feels that he or she is being kept alive by artificial means and life no longer has meaning, it is time to consider the stopping of enteral or parenteral feedings.

21. T F Vitamins A, C, and B12 and the minerals zinc and selenium are said to strengthen the immune system and enable it to overcome the ravages of the HIV infection.

22. T F Proponents of laetrile for AIDS treatment also recommend a strict vegan diet, which is totally inadequate in many nutrients and excessive in others.

23. T F Yeast-free diets prevent diseases such as candidiasis.

24. T F The progression and manifestation for children and adults are the same in HIV infections.

25. T F Children with HIV or AIDS should be fed with any supplements high in kcal and protein that are tolerated, as well as use of added fats and nutrient-dense snacks.

26. T F All food and beverages fed to HIV and AIDS patients must be sterile.

27. T F Standard sanitary practices in food preparation must be followed as the HIV-infected or AIDS patients have limited immunity to foodborne infection.

28. T F For patients with HIV infections or AIDS, smaller portions fed at more frequent intervals is not as good as larger portions at less frequent intervals.
REFERENCES


CHAPTER 22

Diet Therapy for Burns, Immobilized Patients, Mental Patients, and Eating Disorders

Time for completion
Activities: 1½ hours
Optional examination: 1 hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:

 Burns
1. Describe the severity of a burn by its degree.
2. Define the treatment goals of nutritional care of the burn patient.
3. Calculate the nutrient needs of a burn patient.
4. Recognize the teamwork required for efficient nutritional care.
5. Use aggressive nutritional therapy as a major part of the care of the burn patient.

 Immobilized patients
1. Explain the nitrogen balance of such patients.
2. Define the caloric need of such patients.
3. Describe the urinary and bowel functions of such patients.
4. Individualize diet therapy for immobilized patients.

1. Describe the severity of a burn by its degree.
2. Define the treatment goals of nutritional care of the burn patient.
3. Calculate the nutrient needs of a burn patient.
4. Recognize the teamwork required for efficient nutritional care.
5. Use aggressive nutritional therapy as a major part of the care of the burn patient.
Mental patients
1. Describe the best approach to provide optimal nutritional and dietary care for the patients.
2. Explain their confusion about food and eating.
3. Discuss their mealtime misbehavior.
4. Recognize the reasons mental patients reject food.
5. Present multiple considerations in the dietary care for these patients.

Anorexia nervosa
1. Describe the pathophysiological manifestations of anorexia nervosa and bulimia.
2. Discuss the hospital feeding regime suitable for patient with eating disorders.
3. Recognize the necessity of psychological counseling, and make arrangements for this procedure to use behavior modification as appropriate.

Glossary
Acuity: clearness; acuteness.
Amenorrhea: absence of menstruation.
Cachexia: a profound and marked state of ill health and malnutrition.
Decubitus ulcer: an inflammation, sore, or ulcer in the skin over a bony prominence, most frequently on sacrum, elbows, heels, inner knees, hips, shoulder blades, and ear rims of immobilized patients. Results from prolonged pressure on the part. It is most often seen in the aged, obese, debilitated, or cachectic patient, and those suffering from injuries and infections.

Dehydration: excessive loss of water from body tissues, accompanied by a disturbance in the balance of essential electrolytes.
Delusion: persistent, aberrant belief held by a person even though it is illogical, unique, and probably wrong. There are many kinds.
Dementia: organic loss of intellectual function.
Hydration: level of fluid in the body.
Hypercalcemia: greater than normal amount of calcium in the blood, most often resulting from excessive bone reabsorption and release of calcium.
Mental deviation: of, relating to, or characterized by a disorder of the mind.
Mental disorder: any disturbance of emotional equilibrium manifested in maladaptive behavior and impaired functioning. Caused by genetic, physical, chemical, biological, psychological, social, or cultural factors. Also called emotional illness, mental illness, or psychiatric disorder.
Psychological (aspects): the mental, motivational, and behavioral characteristics and attitudes of an individual or group of individuals.
Rehydration: replacement of fluid level in the body.

Background Information
Space limitation has excluded chapters covering diet therapy for a number of other commonly encountered clinical disorders. This chapter remedies the situation by providing student activities to cover four important clinical subjects not yet addressed. The activities cover burns, immobilized patients, mental patients, and eating disorders.

Activity 1:
Diet and the Burn Patient

Background Information
A severe burn is perhaps one of the most painful injuries a human being can receive. Burn patients undergo many of the physiological changes experienced by surgical patients. The extent of the burn injury partly determines the dietary care recommended. Nutritional principles for treating burn patients can also be applied to treating other forms of trauma, and vice versa.

The terms first-, second-, and third-degree burns are frequently used to describe the severity of a burn. A first-degree burn is the least severe and is considered only a superficial injury. Third-degree burns, on the other hand, are life threatening, since the skin is totally destroyed and internal organs adversely affected. The degree, or depth, of a burn injury differs by its area, or percentage of the body affected.

The amount of trauma suffered by patients with burns is dependent upon the type of burn (chemical, electrical, and thermal), extent (both depth and area) of the burn injury, and their age. Together these factors determine the likelihood of mortality. Second- and third-degree burns over 15 percent of the total body surface (10 percent in the elderly and children) can result in burn shock because of the quantity of fluid loss. Burns of more than 50 percent of the body surface are frequently fatal, especially in children and the elderly. Burns that involve the face and respiratory tract are most serious; chemical and electrical burns are more difficult to treat than thermal injuries.

Nutritional and Dietary Care
The goal of treatment is to prevent infection, promote healing, and provide for the body’s increased needs for nutrients and fluids. The therapy should continue until an intact skin is achieved and metabolism is normal.

Badly burned patients are extremely unfortunate. They suffer great pain and sometimes face permanent maiming. In addition, they may be extremely anxious about the consequences of plastic surgery and fearful that an altered appearance will alienate their relatives and friends.
In all major burn traumas, body tissues (and thus protein, cells, and protoplasm) are rapidly depleted, as is reserve energy, since the patients usually experience the most severe form of stress experienced by humans. The continuous loss of body tissue and energy may result in death either immediately after the burn or during the “recovery” period. Proper and aggressive nutritional therapy is critical in treating moderately to severely burned patients.

Acute stress rapidly leads to nutritional deficits, which greatly impede the body’s efforts to heal damaged tissue and resist bacterial invasion. Proper dietary care can make the difference between life and death. Patients in good nutritional status and with small burns recover because they can eat sufficient food for their needs. However, the survival of an undernourished person suffering a severe burn depends heavily on aggressive nutritional therapy.

The nutritional requirements of burn patients are directly related to the extent and degree of burn. In general, burn patients have more nutritional problems than patients with other kinds of trauma. Since those with large burns have the most difficulty in maintaining an adequate oral intake, they sometimes become debilitated, even in a well-organized and adequately staffed burn center. The nutritional complications of burn victims are worse than those of major surgical patients, since their nutritional therapy is much more than just supportive care.

Many interferences make feeding burn patients difficult. Loss of appetite may occur for many reasons (fear, depression, drug therapy, and so on), making it difficult for patients to eat enough food to meet bodily requirements. An inability to move the head, hands, body, or feet in some patients also makes self-feeding difficult. If pain accompanies any attempt to chew, eat, or swallow, avoidance of food is common. The changing of dressings and skin grafting may also interfere with mealtime. Close supervision and encouragement of the patient are necessary to assure that as many nutrients as possible (especially protein) and optimum calories are ingested.

**CALCULATING NUTRIENT NEEDS**

This information applies to adult patients only. Consult the references for data applicable to a pediatric patient.

A burn patient has a special need for calories and protein in large amounts to replace fat loss, repair and deposit lean tissues, maintain body functions, and restore water loss. The calorie requirement may be as large as 6000–8000 kcal/d. This energy expenditure increases with the size of the burn and may be 30%–300% above basal levels, and it remains at high levels until grafting is completed. Sources of body weight loss are the breakdown of fat and protein as well as water loss. Food that is consumed provides about 5000–6000 kcal/d, and the breakdown of body fat provides about 1000–2000 kcal/d. A formula to calculate the caloric need of a patient with a burn injury is as follows:

\[ \text{Daily caloric need} = 25 \text{ kcal/kg body weight} + 40 \text{ kcal/\% body surface with burns} \]

In the following example, assume that the patient weighs 75 kg and has 50% of body surface burned.

\[
\text{Daily caloric need} = 25 \times 75 + 40 \times \frac{50}{100} \\
= 1875 + 2000 \\
= 3875 \text{ kcal (allow 1000 kcal for margin of safety)} \\
= 4500 \text{ kcal (approximately)}.
\]

A burn victim needs more protein to cover skin loss, blood protein loss from the burn, and infection.

The following formula is used for calculating the protein needs of a burn patient:

\[ \text{Total daily protein need} = 1 \text{ g/kg body weight} + 3 \text{ g/\% body surface with burns} \]

Assume that an adult patient weighs 75 kg and that 50% of the body surface has burns. The current recommendation for an adult burn patient is 20% of calories from protein (maximum). The calculations are as follows:

\[
\text{Total daily protein need} = 1 \times 75 + 3 \times \frac{50}{100} \\
= 75 + 150 \\
= 225 \text{ g protein}
\]

A burn patient particularly needs calories and protein. However, in planning menus, fats should provide 30%–40% of total calories, and carbohydrates 45%–55%. A moderate amount of fat is judicious at the beginning, since a large amount of fat tends to satiate the patient and reduce the patient’s appetite.

Most clinicians prescribe 2 to 10 times the RDAs/DRI for water-soluble vitamins for burn patients. Vitamin C is given in amounts 20 to 30 times the RDA/DRI. However, fat-soluble vitamins are usually prescribed guardedly because of potential risks.

The mineral needs of burn patients require attention even after the fluids and electrolytes have been balanced. Body potassium, iron, calcium, zinc, and copper may have been lowered to unacceptable levels and should be monitored daily and replaced as needed.

**ENTERAL AND PARENTERAL FEEDINGS**

It is almost impossible to feed burn patients three large meals a day that contain up to 6000 kcal with 200 or
more grams of protein. Oral feeding (OF) may not be sufficient. For a patient with moderate to severe burns, it is sometimes necessary to use several feeding methods to supply adequate protein and calories. This means enteral feeding (EN) or tube feeding and/or parenteral feeding (PN).

Tube feedings can be used depending on the burn sites. For example, a patient with head and neck burns would not receive EN. Early finding, especially the need for EN, is always an issue with a patient in critical care. It has a different meaning for the medical team in different clinical institutes. The word early may mean within a few hours of surgery or injury, while for others, early means initiation of feeds within days of surgery or injury. Early feeding also applies to OF, EN, and/or PN.

Early EN has benefits and risks and should be individualized. Tube feeding reaching the bottom of the stomach is ideal in the critically ill because it allows for early initiation of nutrition support, within hours of injury or surgery. Once the feeding is started, it is not necessary to decrease the rate or withhold feedings for medical therapies such as dressing changes, rehabilitative care, surgery, changing intravenous lines, and adjusting supine or prone positioning. Some medical teams prefer the feeding tubes reaching within the stomach itself.

Clinical observations have confirmed that early EN without PN is safe, well tolerated, and costs less. With partial dysfunctional digestive tract, the patient still has the viable option to consume nutrients via the nasoduodenal or nasojugal delivery.

PN feeding is necessary for some patients with abdominal trauma, persistent intestinal infection or inflammation, severe diarrhea, and other conditions that interfere with digestion and absorption or when sufficient calories and protein cannot be delivered orally or enteral. When PN is used, simultaneous provision of EN feeding whenever feasible is recommended to promote gut function and maintain the mucosal barrier. As the rate of EN feeding is increased the rate of PN is decreased. In general, EN and PN are provided to patients whose digestive tracts are unable to tolerate the volume of feed that is most likely to be large.

PN is used very successfully in restoring balance in and healing severely burned patients. In some burn centers, however, PN is used as little as possible because of the danger of infection, and sometimes the access sites are not available if the patient is burned over a large area of his or her body. This feeding method will definitely be used, however, if EN is unsuccessful, because the nutrition of the patient has the higher priority.

**TEAMWORK**

The nutritional care of a burn patient requires efficient and conscientious teamwork. Many burn centers have established standard guidelines for dietary care. All team members should follow the individualized plans and goals for a particular patient. All personnel should encourage the patients to eat and provide them with psychological support. The entire health team monitors the progress and status of the patient to be certain that nutritional needs are met. Weight status and caloric intake are the two main criteria used. Weighing is done on a daily basis, as is intake and output, and all pertinent information is carefully recorded so that the diet therapy can be adjusted as needed.

**NURSING IMPLICATIONS**

Be aware that aggressive nutrition therapy is the major part of care for a burn patient.

1. A loss of more than 10% of preburn body weight places the person at high risk for sepsis and/or death.
2. Peak metabolic needs occur 6–10 days after the injury.
3. Fluid loss is a grave concern immediately after a burn.
4. Replacement of fluid and electrolyte losses is a major concern to prevent hypovolemic shock.
5. Fats, which are calorie dense, help increase caloric intake.
6. The burn patient is thirsty and dehydrated despite the edema that may be present. If NPO (nothing to eat or drink orally), good oral hygiene is necessary.
7. IV solutions of electrolytes, glucose, and especially saline may be necessary. Potassium deficit may occur.
8. Schedule dressing changes, pain medications, and other measures far enough in advance of mealtime that they will not interfere with meals.
9. Foods high in zinc increase wound healing. These include meat, liver, eggs, and seafood.
10. Early ambulation reduces calcium and protein losses due to immobilization.
11. Renal calculi is a common occurrence in the immobilized patient. A generous fluid intake is necessary.
12. “Fast” foods, favorite dishes from home, and any other desired items should be encouraged.
13. Educate the patient and family about the importance of diet to recovery.
14. Tube feedings or TPN, if needed for healing, should be instituted.

**Progress Check on Activity 1**

**TRUE/FALSE**

Circle T for True and F for False.

1. T F Burn patients and surgery patients experience many of the same changes.
2. T F A first-degree burn is the most serious of burns.
3. T F Acute stress leads to nutritional deficits.
4. T F Burn patients have fewer nutritional problems than psychological ones.
5. T F Burn patients have little difficulty in maintaining an adequate diet if it is properly prepared and served.

MULTIPLE CHOICE
Circle the letter of the correct answer.
6. The amount of trauma suffered by patients with burns is dependent on:
   a. the type of burn.
   b. previous nutritional status.
   c. age of the person.
   d. all of these.
7. Burns of more than ______ of body surface are often fatal.
   a. 15%
   b. 25%
   c. 50%
   d. 10%
8. Nutritional requirements of burn patients are directly related to:
   a. extent and degree.
   b. type and site.
   c. location and time.
   d. age and previous health.
9. Energy expenditure increases in burn patients range between:
   a. 10%–20%.
   b. 100%–1000%.
   c. 500%–5000%.
   d. 30%–3000%.

FILL-IN
10. List five interferences to successful feeding of burn patients.
   a. ___________________________
   b. ___________________________
   c. ___________________________
   d. ___________________________
   e. ___________________________
11. Identify three sources of body weight loss of burn patients.
   a. ___________________________
   b. ___________________________
   c. ___________________________

SITUATION
12. Lenny Lambrusco, age 10, has received second- and third-degree burns over 40% of his body in an accident. He weighs 77 pounds. Calculate the amount of protein Lenny will need to repair and replace damaged tissue.
13. List five nursing implications for nutrition that must be observed in caring for a burn patient.
   a. ___________________________
   b. ___________________________
   c. ___________________________
   d. ___________________________
   e. ___________________________

ACTIVITY 2:
Diet and Immobilized Patients

INTRODUCTION
A surgical and medical patient may be temporarily immobilized by being confined to bed. Older, chronically ill, disabled, and handicapped patients may be immobilized for many years. Some patients, such as those recovering from strokes, may be gradually rehabilitated, progressing from bed confinement to the use of a wheelchair, crutches, and a cane and finally being able to walk freely. During the immobilization period, there are four important considerations in the patient's nutritional and dietary care: nitrogen balance, calories, calcium intake, and urinary and bowel functions.

NITROGEN BALANCE
Long-term bed confinement causes body muscle to atrophy, even in a healthy person. This process is characterized by a negative nitrogen balance (see Chapter 3). An otherwise healthy person may lose about 2 to 3 g of nitrogen a day given an adequate calorie and protein intake. This means a loss of 13 to 20 g of protein. To compensate for that loss, the person must eat extra protein. A chronically ill person confined to bed will also suffer skin lesions resulting from decubitus ulcers (bedsores). These ulcers may be caused by prolonged pressure on some areas of the skin or an infection that aggravates the sloughing of skin cells. This skin sloughing can also contribute to the negative nitrogen balance. During early immobilization, muscle atrophy and skin sloughing cause a nitrogen loss far exceeding protein intake; this loss cannot be arrested even by a high protein intake. However, over a long period, a high-protein diet can reverse muscle loss and partially maintain the integrity of the skin.
Actual skin breakdown can be avoided only by a combination of a high-protein diet, frequent position adjustment, exercise (whenever feasible), special materials for sheets and bedding, and good hygiene. As debilitated patients stabilize, they excrete less nitrogen and can adapt to the stress of illness. However, tissue atrophy and skin lesions can continue and must be guarded against. Depending on the clinical condition, immobilized patients need 70–120 g of protein a day. In addition, vitamin C intake should be elevated to offset the increased stress.

**CALORIES**

The caloric intake of an immobilized patient is also very important. It must be continuously monitored and adjusted to the clinical condition of the individual patient. For example, a young athlete suffering from a bone fracture will need a high caloric intake for recovery. Some patients continue to lose weight; some reasons include catabolic and nonspecific effects of trauma and loss of appetite. During the beginning of bed confinement, weight loss may be avoided by a high caloric intake. As the patient's weight stabilizes, the caloric intake must be adjusted to the patient's condition. Patients undergoing physical therapy work hard and may also need a high-calorie diet. But an immobilized patient who is recovering slowly, is quiet, and does very little exercise needs a normal diet or a diet that is slightly low in calories to maintain body weight. Paralyzed patients can gain weight easily because food is their main enjoyment, and they are quite inactive. The excess weight will further limit their activity. To prepare for rehabilitation and a reasonable degree of mobility, paralyzed patients must maintain their ideal weight.

**CALCIUM**

Bedridden patients have disturbed calcium metabolism, especially patients with bone fractures. Calcium homeostasis is determined by a number of factors: bone integrity, serum calcium, intestinal function, adequacy of active vitamin D, kidney function, and parathyroid activity. Prolonged immobilization may lead to disorders related to excessive calcium: hypercalcemia, hypercalciuria, metastatic calcification of soft tissues such as muscle and kidney, and calcium stone formation in the bladder, kidney, or urinary tract. Characteristic symptoms of hypercalcemia are nausea, vomiting, loss of appetite, excessive thirst, excessive urination, headache, constipation, abdominal pain, listlessness, malaise, dehydration, psychosis, blunting of pain sensations, and coma. If untreated, the condition can lead to kidney failure, high blood pressure, seizures, and hearing loss. The treatment (mainly rehydration) for acute hypercalcemia is as follows: (1) intravenous fluid therapy with saline; (2) intravenous diuretic medications and replacement of all urinary loss of sodium, magnesium, and potassium; (3) replacement of any excessive urine loss by fluid (intravenous saline); and (4) implementation of a low-calcium diet. If there is no response, other modes of therapy are necessary. The long-term treatment for hypercalcemia involves: (1) mobilization as soon as possible; (2) calcium intake kept at 500 to 800 mg/d (a low-calcium diet may not be effective if volume expansion has not been brought under control); and (3) phosphate supplement, which helps some, but not all, patients.

**URINARY AND BOWEL FUNCTIONS**

An immobilized patient may have problems with the excretory system. The patient should drink a lot of fluid to make certain that the bladder and kidneys are kept clear. In patients with spinal cord injury, the loss of bladder control may expose the genitourinary tract to a higher risk of infection. When there is no hypercalcemia, the immobilized patient may actually have reduced intake and the decreased fluid intake may precipitate formation of calcium stones. Because of the importance of hydration, the patient should be monitored with some recording system either at home or in the hospital. The time and amount of water taken in both beverage and food should be estimated, and the time, frequency, and volume of urination should be recorded.

Bowel movements of immobilized patients pose special problems. Some develop diarrhea and others constipation. Patients must avoid foods that tend to cause gas or indigestion. They should also drink a lot of fluid, eat an adequate amount of fiber, and establish good bowel habits to avoid constipation.

**PROGRESS CHECK ON ACTIVITY 2**

**FILL-IN**

1. Four considerations in an immobilized patient's nutritional and diet care are:
   a. 
   b. 
   c. 
   d. 

2. Actual skin breakdown can be avoided only by a combination of:
   a. 
   b. 
   c. 
   d. 
   e. 

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3. Calcium homeostasis is determined by factors such as:
   a. 
   b. 
   c. 
   d. 
   e. 
   f. 

4. Diseases related to excessive calcium are:
   a. 
   b. 
   c. 
   d. 

5. Long-term treatment of hypercalcemia includes:
   a. 
   b. 
   c. 

TRUE/FALSE
Circle T for True and F for False.

6. T F Long-term bed confinement causes body muscle atrophy with a negative nitrogen loss of at least 2–3 g of nitrogen a day.

7. T F A chronically ill person confined to bed suffers skin lesions resulting from decubitus ulcers (bedsores).

8. T F During early immobilization, atrophy and skin sloughing cause a severe negative nitrogen loss.

9. T F Muscle loss from immobilized patients cannot be reversed.

10. T F Immobilized patients need 70–120 g protein a day with vitamin C supplement.

11. T F Calorie intake of immobilized patients must be adjusted to the clinical conditions of the individual patient.

12. T F Prolonged immobilization may lead to obesity.

13. T F Immobilized patients should drink a lot of fluids to make certain that the bladder and kidneys do not atrophy.

14. T F Intake of fluids for all immobilized patients is basically the same.

15. T F Immobilized patients should avoid foods that tend to produce gas or indigestion.

16. T F Immobilized patients should try to maintain good bowel habits.

ACTIVITY 3: Diet and Mental Patients

INTRODUCTION
A large number of people in this country are confined to mental institutions—half of all available hospital beds are occupied by such patients. The adequacy of care provided in a mental institution has been subject to public scrutiny for many years. Because of the complex social, political, economic, and medical issues involved, this will be a subject of controversy for many more years.

In many respects, mental patients do not differ from normal people. They need human understanding and a meaningful relationship with their environment and the people around them. They have many of the same attitudes to food as normal people, such as having food preferences and responding to the attractiveness of foods served (see Chapter 14). They need more than a well-balanced diet, however. Food and eating are especially important to them, because they are deprived of many of the other joys of life. Contrary to past belief, proper care can improve nutritional status in these patients, as evidenced by clinical studies.

In planning nutritional and dietary care of a mental patient, a well-coordinated and concerted effort is needed from every member of the health team, which may include a psychiatrist, nurse, social worker, therapist (occupational, physical, or recreational), nutritionist, dietitian, psychologist, clinical specialist, and health aides.

A patient needs total care, which requires several considerations. One is the provision of adequate healthcare facilities and programs. Once a patient has been admitted to an institution, financial problems, family acceptance, and negative social attitudes toward mental illness pose special problems for the patient. Regarding nutritional care, a special diet therapy may be required. The patient's nutritional status and the need for rehabilitation must be evaluated. In addition, feeding a mental patient demands special procedures.

Care in mental institutions varies tremendously. Although each state establishes guidelines for public as well as private mental hospitals, numerous reports have documented substandard or plainly deficient care provided by some institutions, both private and public. Many criticisms are leveled at nutritional care.

In general, these hospitals are crowded and underbudgeted. Food budgets in particular are grossly inadequate. Facilities and equipment are out of date, misused, inadequate, and sometimes even decrepit. This pertains to the kitchen layout, equipment, and serving utensils. Dining environments are unsatisfactory. Dull dining rooms, old and displaced draperies, uncomfortable chairs, and even poor sanitation may add to an already depressing environment.
Mealtime Misbehavior

Mental patients may have many disrupting eating behaviors. These include throwing food and dishes, interfering with other patients’ meals, playing with and discarding food, and eating others’ leftovers. Patients may also ignore personal cleanliness by spitting out food and catching food thrown in the air. This behavior may result from defective mental coordination or be an expression of a whole spectrum of emotional problems. The appropriate remedy depends on whether mealtime misbehavior results from the mental derangement. If it does not, the nurse and dietitian should apply interpersonal techniques, such as ignoring the behavior. Using plastic or paper utensils reduces danger and the cost of replacing broken items.

Food Rejection

Mental patients may refuse food for many reasons, some of which are familiar and some of which are not. One familiar cause is the side effects of drugs that have been administered. Also, vomiting and food intolerance may make patients afraid to eat. The simplest reason for reduced food intake is that an overweight patient is following a self-imposed regimen of weight reduction.

Reasons for reduced food intake peculiar to mental patients include a malfunctioning hypothalamus. This problem weakens hunger reactions, making the patient want less food. A patient’s mental problems may also have caused a loss of coordination, knowledge, or confidence in food acceptance. Refusing food may be a simple rejection of what food represents to or evokes in the patient (such as an event, guilt, or a lost relative). Finally, the patient may be suffering a multitude of psychological problems, such as depression, hearing voices, confusion, hallucinations, and obsession.

A nurse, dietitian, or nutritionist will find several guidelines useful in helping a patient accept food. Frequent communication is highly desirable, because talking demonstrates concern and will thus make a patient feel better. However, this communication should never include accusations of bad behavior in relation to food. Such accusations could cause the patient to reject food again.

It should be ascertained if refusal of food is related to a specific physiological disorder, because some patients may be reluctant to mention it. In some cases, the use of drugs or hormones (such as insulin) may increase a patient’s appetite. In others, forced feeding or assistance in eating is required. A patient should never be made to feel guilty or uncomfortable about any extra work that the staff may have to perform to help the patient eat.

If a patient refuses food frequently, the meals missed and the quantity of food involved should be recorded. For instance, a patient may not like to eat at a certain time,
and so the feeding time should be adjusted, if possible. Also, an attempt must be made to replace missed meals.

In feeding mental patients, their emotional makeup must be known. Defiance, submission, self-contempt, constant demands for love and affection, and suspicion of food poisoning are some characteristics of a disturbed personality. Concerned staff and volunteers can use appropriate communication to convince patients to eat and enjoy their food, thus improving the quality of patients’ lives.

The eating environment must be pleasing, clean, convenient, gay, and comfortable with attractive pictures, paintings, tables, and chairs. Group dining has proved successful in improving the eating habits of patients. They enjoy eating with other patients, relatives, and staff. Thus, arrangements should be made so that they can eat with others at regular intervals. Group dining may be enhanced by having cafeteria-style meals that provide patients with a wide variety of foods.

Other considerations in feeding mental patients are as follows: (1) If the image of a prison or institution can be transformed into that of a clinic, patients show appreciation and improvement. (2) Obesity or weight gain may be the result of extra foods given by relatives and night-time staff. Such occurrences should be identified and corrected. (3) Keeping a weight record is important to make sure that the patient is not gaining or losing too much weight. (4) Many patients are pleased and feel needed when the hospital pays attention to their birthdays and gives them special treats. The same applies to holidays and festivals. There are some special considerations in the dietary care of elderly mental patients. For example, the psychiatric problems of depression, confusion, anxiety, and suspicion in a mental patient are even more exaggerated when the patient is older. These patients are generally overconcerned about the functions of the alimentary tract. Their worry and concern can aggravate intestinal motility and cause cramps and even distension. Elderly mental patients also tend to need more security and more of their favorite foods. Depression and suspicion that food is poisoned may lead them to refuse food often. As a result of confusion, elderly patients may ignore food altogether.

In the last few years, psychotherapy, drugs (such as sedatives and tranquilizers), and electric shock treatment, which are now standard management programs, have helped some patients to gain a semblance of normalcy in their lives. As a result, many of these patients are no longer institutionalized. Many discharged patients who have an unsatisfactory nutritional status can be taught to nourish themselves adequately. In fact, good nutritional and dietary care with the proper vitamin and mineral supplements may improve a patient’s psychological condition. However, many patients receive medications that may harm their nutritional status.

These discharged patients have the same eating problems as those living in the hospital, and they need the same remedies. Because many of these patients still attend treatment centers and clinics and need occasional hospitalization, some nurses and dietitians have succeeded in providing them with sound nutritional education programs. Included in these programs are the following:

1. Teaching some basic facts and skills about food budgeting, purchasing, and preparation. Many of these patients have never cooked before or have not been cooking for a while.
2. Teaching principles of nutritional needs.
3. Teaching known effects of drugs on nutritional status. Practically all mental patients receive some medications; some profound effects of these drugs on nutritional status are discussed in Chapters 10 and 14. Teaching basic facts about food, such as proper sanitation and safety, meal planning, storage, freezing, use of equipment, and so on.

**NURSING IMPLICATIONS**

**General Guidelines**

1. Recognize that appropriate nutrition therapy is a major part of care for immobilized and mental patients.
2. The plan of care and approaches may differ. Use whatever method and manner of feeding that is most effective.
3. Check all medications that a patient is receiving; some may interfere with nutritional status. Ask for changes if warranted.
4. Provide nutrition education to patients, family, and caregivers.

**Some Specific Considerations**

**Immobilized Persons**

1. Closely monitor hydration. Chart time and amount of fluids ingested (including liquids in foods).
2. Observe the types and amounts of food consumed. Be especially cognizant of protein intake, which should be adjusted to patient’s condition. Chart concerns and call attention to M.D. and RD if necessary.
3. Examine patient’s skin for signs of decubiti formation, change type of bedding used, and give frequent position adjustments.
4. Increase protein and calorie intake. Add vitamin and mineral supplements if not already part of therapy.
5. Monitor bowel habits (diarrhea or constipation may be present), and adjust diet accordingly.
6. Bedridden patients have disturbed calcium metabolism. Check for symptoms of hypercalcemia and dehydration. Rehydration is critical. A low-calcium diet may be helpful.
7. A reduced caloric intake may be indicated for those who are immobilized for long periods (such as paralyzed patients). Excessive weight gain is common. Identify “extras” brought in by well-meaning family and friends (or staff), and correct. Keep a weight record.

8. Adjust caloric intake to the clinical condition; young people who will be immobilized for short periods of time (such as with fractures) will need a higher caloric diet than those of long-term patients.

Patients with Mental Deviations

The psychological aspects of feeding are very important for this group of patients.

1. Monitor the patient’s weight, nutritional status, and mental attitude and be prepared to intervene.
2. The eating environment should be pleasing, clean, comfortable, and attractive.
3. The attitude of staff serving food should be pleasant, cheerful, and helpful.
4. Pay careful attention to what is served: food should be appropriate to the individual patient. For example, a blanket low-sodium diet is unsuitable for all patients.
5. The food should be prepared and served under sanitary conditions. The dietary staff should be clean and neat in appearance.
6. Pay careful attention to patient’s needs such as eating handicaps, lack of hand and mouth coordination, chewing and swallowing difficulties, food likes and dislikes, sore mouths, edentulous, and so on.
7. Food should be served either hot or cold, as appropriate, and be seasoned well.
8. Be aware of the patients’ emotional status, such as confusion, anxiety, suspicion, refusal to eat, and disruptive eating habits:
   a. Techniques: establish communication lines, provide assistance with eating, help with food selection, and use behavioral strategies.
   b. Record meals missed and quantity of uneaten food. Attempt to replace missed meals. Force feeding is a last resort.
9. Special care for the elderly:
   a. All emotional and behavior problems are exaggerated in the elderly, especially depression, anxiety, confusion, suspicion, and refusal to eat.
   b. The elderly are prone to overconcern regarding bowel functions.
   c. Techniques: provide more security, attempt to gain trust, serve more favorite foods, and give verbal reminders that they must eat.
10. Provide nutrition education to patient, family, and/or caregivers. These patients go home, and most need nutrition education on a range of topics, such as what to feed, how much, and sanitation procedures. (See list at the end of this activity for other suggestions.)

11. Enlist the help of the clinical dietitian, if needed for help with planning and handout materials. Group sessions are usually well received. A translator may be needed.

---

PROGRESS CHECK ON ACTIVITY 3

**FILL-IN**

1. The health team of a mental patient includes:
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
   e. ____________________________
   f. ____________________________
   g. ____________________________
   h. ____________________________
   i. ____________________________

2. Criticisms on nutritional care in mental institutions include:
   a. ____________________________
   b. ____________________________
   c. ____________________________

3. Some of the basic reasons why mental patients have nutritional and dietary problems are:
   a. ____________________________
   b. ____________________________
   c. ____________________________

4. General guidelines for nursing immobilized and mental patients:
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________

**TRUE/FALSE**

Circle T for True and F for False.

5. T F A malfunctioning hypothalamus causes a mental patient to overeat.
ACTIVITY 4:
Part I—Eating Disorders: Anorexia Nervosa

BACKGROUND INFORMATION

Anorexia nervosa refers to the clinical condition in which a person voluntarily eats very little food (self-imposed starvation). As a result, there is a large weight loss with all of its concomitant symptoms. The disorder is more common among females, especially teenage girls, although it has been identified in men and older women. Typically the teenage female patient comes from a middle- to upper-middle-class family. Before the problem occurs, the patient is usually healthy and cooperative and has made good progress in school. All indications point to a “model” student and child. Then, the child develops psychological problems leading her to resent her obesity (which may be real or imagined) and embarks on a self-prescribed starvation diet. She continues to abstain from food even when she has achieved an ideal weight. After that, her health deteriorates.

CLINICAL MANIFESTATIONS

The anorexic patient presents several clinical manifestations. Although the desire for food is present, the patient refuses to eat and drink. Occasionally the patient has an uncontrollable urge to gorge, which is followed by self-induced vomiting. Because of this, anorexic patients may lose 25%–35% of their body weight and become emaciated and wasted. Electrolyte imbalances occur, and female anorexic patients develop hair over different parts of their body and cease to menstruate. Also present is decreased body metabolism, cold hands and feet, decreased blood pressure, and decreased sensitivity to insulin. Bone density is compromised, leading to stress fractures, especially in female athletes. The heart muscle becomes thin and weak, the immune system is impaired, anemia develops, insomnia is common, and both men and women lose their sex drives. Anorexic patients exhibit abnormal behavior such as frequent self-induced vomiting, excessive use of cathartics (laxatives), and overexercise (hyperactivity). In some patients, such actions may lead to death.

A number of events can spark the beginning of a voluntary, continuous reduction of food intake. A worsening mother-daughter relationship may set it off, or a sudden, highly emotional conflict between the patient and someone else may do so. Other possible causes are an abrupt failure in schoolwork and the emotional turmoil over beginning or continuing a sexual relationship.

In-depth studies by psychologists and psychiatrists of anorexic patients have indicated a common psychological profile. These patients show a lack of feeling for hunger, satiety, tiredness, and sometimes even physical pain. They generally have a distorted image of their physical size. Some anorexic patients think that they are 40%–60% larger than they, in fact, are. Consequently, they become obsessed with dieting. In addition, these patients commonly feel inadequate in role identity, competence (work or school performance), and effectiveness (in communication, controlling events, etc.). This loss of faith in personal ability leads to an attempt to control the environment by controlling body weight. Food binges, guilt about eating, and a reluctance to admit abnormal food habits are the typical attitudes of anorexic patients toward food.

Treatment for a patient with anorexia nervosa consists of psychotherapy, behavior modification, drug therapy, and hospitalization for refeedings. The treatment objective of diet therapy and hospital feedings is to return the patient to a normal diet and an appropriate, healthy weight. A discussion of rehabilitative measures used in hospitals follows.

HOSPITAL FEEDING

Patients with anorexia nervosa are best hospitalized, because the eating environment can be controlled and family involvement is minimized. Some patients eat better in a hospital because they do not have to make any decisions about what and when to eat. In general, satisfactory care requires careful planning, an experienced staff, and a tremendous amount of concern and understanding.
Once anorexia nervosa has been diagnosed, the first major responsibility of the health team is to develop a dietary and nutrition program. There should be complete understanding and communication among the health team members to avoid any inconsistency or friction. This is important, since the patient may try to manipulate healthcare personnel and parents in order to avoid food intake and secure an opportunity to exercise. Most anorexic patients want to maintain a starved appearance. The nurse can coordinate all activities to assure that the program is implemented. The doctor should describe the treatment procedures to the patient, preferably in the presence of the primary nurse and the dietitian or nutritionist.

Detailed procedures for feeding a hospitalized patient with anorexia nervosa may be obtained from the references at the end of this chapter. General guidelines are given here.

The attending physician will prescribe a diet after studying the patient's condition. Most practitioners start with a diet containing 1000–3000 kcal and progressively increase the intake by 200 kcal every three or four days until the daily intake is adequate for an acceptable weight gain. A liquid diet may be more acceptable to the patient; it appears to have fewer calories. To avoid any misunderstandings, any changes in caloric intake must be made by the doctor or an assigned coordinator in the form of a written request. A cooperative patient can be fed three main meals and occasionally a snack. Elimination of privileges followed by a gradual return of them for compliance is a viable approach. The nurse should be fully informed of the patient's condition, including the treatment protocol. Most importantly, the attending nurse should monitor the patient's eating behavior and pay full attention to the following feeding routines.

1. Check that the foods served comply with the meal plan.
2. Pay attention to the patient’s hands constantly.
3. Assume a friendly and supportive attitude so that the patient will not feel spied on.
4. Leave the room only in an emergency, since the patient may try to get rid of some foods.
5. Prevent food disposal by keeping any container (such as a facial tissue box, a wastebasket, or a flower pot) away from the patient during the meal and checking the meal tray after the patient has finished eating. The patient may hide food under napkins or smear it under the bed, on the window sill, and so forth.
6. Permit a maximum of one hour for eating a meal.
7. If feasible, arrange for the patient to eat alone and be monitored by the same nurse.
8. If possible, the patient should wear a pocketless hospital gown while eating.
9. Insist that the patient rest for ½ to one hour after a meal and does not leave the bed, since she may induce vomiting.

Recovery is a long and difficult process that may last from six months to one year or more. About 60%–70% of all patients may recover after several years of treatment; the remaining patients may die. Real recovery is extremely important, since most of these patients tend to be mentally unstable, and the condition will tend to recur at other stressful times in their lives.

NURSING IMPLICATIONS

1. All team members must be consistent and caring in their handling of the feeding routines.
2. Patients may not manipulate or dictate food intake.
3. Feeding periods must be closely supervised.
4. Bathroom privileges must be denied for at least 30 minutes after a meal to prevent self-induced vomiting.
5. Major sleep disturbances that occur early in treatment cease as the patient gains weight.
6. Avoid all conversation related to food or weight gain while the patient is hospitalized, except as it relates to an agreed-upon contract (“You have complied with diet goals this week so you may [have] [get] [do] the reward.”).
7. Nutrition education for patient and family can begin when the patient is discharged.
8. Psychological counseling takes precedence over nutritional counseling.

Progress Check on Activity 4, Part I

MULTIPLE CHOICE

Circle the letter of the correct answer.

1. Clinical manifestations of anorexia nervosa include all except which of these?
   a. disinterest in food
   b. hypotension
   c. hyperactivity
   d. amenorrhea

2. Typical mental attitudes of anorexic patients include:
   a. guilt.
   b. denial.
   c. inadequacy.
   d. all of the above.

3. Prioritize the following treatment measures for an anorexic patient:
   a. diet therapy, drug therapy, psychotherapy
   b. behavior modification, psychotherapy, diet therapy
   c. psychotherapy, behavior modification, drug therapy, hospitalization
   d. hospitalization, drug therapy, diet therapy, psychotherapy
4. The first responsibility of the health team assigned to care for an anorexic patient is to:
   a. remove all sources of stimulation from patient.
   b. develop a satisfactory nutrition program.
   c. implement behavior modification techniques.
   d. assign someone to carefully monitor the patient.

5. The initial diet therapy for an anorexic patient consists of approximately ____ calories.
   c. 3000–4000.
   d. 4000–5000.

FILL-IN

6. Name five feeding routines that should be observed by the nurse attending a patient with anorexia nervosa.
   a. ________________________________
   b. ________________________________
   c. ________________________________
   d. ________________________________
   e. ________________________________

7. Name five important nursing implications to observe when caring for persons with anorexia nervosa.
   a. ________________________________
   b. ________________________________
   c. ________________________________
   d. ________________________________
   e. ________________________________

**ACTIVITY 4:**

**Part II—Other Eating Disorders**

**BACKGROUND INFORMATION**

As more and more Americans, especially women, strive for the “ideal” body, which is culturally defined as “model” thin, or even thinner, the number of psychological and physical illnesses from eating disorders continues to rise. The trend continues down to the elementary school level, where girls as young as 9 or 10 are beginning to diet. Young boys know that a major criterion for social acceptance is a thin, muscular frame, and so they, too, fall prey to eating disorders. Two widely practiced behaviors for both sexes is cyclic dieting, which leads to the chronic dieting syndrome; and the binge-and-purge syndrome, bulimia nervosa. A brief description of each and some suggestions for dietary management follow.

**BULIMIA NERVOSA**

This term is descriptive of the pattern of the disease. Huge amounts of food (up to 5000 kcal in a single sitting, eaten rapidly) are consumed. This is followed by feelings of guilt and shame at the loss of control. In response to these feelings and the need to purge the body of this vast intake of food, the person practices self-induced vomiting; uses laxatives, diuretics, or diet pills, and/or engages in strenuous exercise. The effect of these behaviors on the body is very damaging. The effect on the psyche is also damaging, leading to loss of self-esteem and depression. Persons with bulimia usually keep it a guilt-ridden secret until their symptoms become apparent.

Some of the physical symptoms of bulimia include:

1. Blood-shot eyes and broken blood vessels on the face. Decayed teeth and eroded enamel on the teeth from self-induced vomiting. There may also be bruises on the hand that is used to induce the vomiting.
2. Sore throat, swollen salivary glands, and infrequently, esophageal tears or ruptures of the gastric mucosa
3. Intestinal problems from overuse of laxatives.
4. Although fatigue is common, as is cessation of menses, the weight fluctuates. Clients are not usually underweight or, if they are, they will cycle back to their previous weight, and sometimes weigh more than they did previously.

**CHRONIC DIETING SYNDROME**

This disorder, newly classified by the American Psychiatric Association, is commonly called “compulsive overeating.” It is a reaction to psychological stressors, such as anxiety and emotional problems, or a need for comfort. A great deal of compulsive overeating follows very restrictive dieting practices in an attempt to reach an unnatural and unrealistic weight goal. When failure occurs, rebound eating follows. This creates the characteristic weight cycling. Each time a cycle occurs the Basal Metabolic Rate (BMR) drops, and in the next dieting cycle, the weight comes off more slowly than before. Lean body mass is also lost with each cycling; and it is not regained with the refeeding. Body composition is altered.

**MANAGEMENT OF BULIMIA AND COMPULSIVE OVEREATING**

Managing these eating disorders will require a concerted effort by the health team. As a rule, these clients are not hospitalized; they are managed on an outpatient basis. The approach is individualized to the client,
and psychological treatment will be a priority. Clients may receive antidepressant drug therapy along with counseling. Nutrition education and counseling receive high priority. Behavior modification is helpful. Support groups and/or one-on-one counseling in combination with other therapies and follow-up care are needed.

The strategies for nutrition management should include written material such as diet plans and behavioral techniques. The client should keep a journal or log of the food eaten and the things that he or she believes trigger the eating frenzies. Diets should be planned to not go below the average 1200–1500 kcal basal requirements. Foods such as fruits, vegetables, and cereal grains that are high in fiber are emphasized. Clients are advised to use only those foods that are preportioned and only those that are eaten with utensils (not finger foods). The diet should follow the guidelines for nutrient distribution as discussed in Chapters 7 and 14, with 50%–55% complex carbohydrates, protein according to the RDA/DRI for their age and size, and no more than 30% fat.

Students will find that many clients with eating disorders are already knowledgeable about good weight-management practices but are not able to follow them. This is the challenge that health professionals face, but these are serious health matters, and until the societal pressures for excessive thinness are resolved, clients must be assisted to change their individual attitudes and feelings to a healthier outlook.

**PROGRESS CHECK ON ACTIVITY 4, PART II**

**Self-Study**

Situation: You have a friend whose 14-year-old daughter is causing her concern. She confides to you the following: Jenny is so different lately; she has become quite secretive. She has dark circles under her eyes, and her neck looks swollen. I’ve asked her several times if she’s OK, and she says yes, just tired. I suppose she is, she eats pretty well and hasn’t lost weight, but I think she must have trouble digesting her food. I hear her in the bathroom after meals, and it sounds like she is throwing up, but she says I’m mistaken. Do you think I should force her to go to the doctor, or is this just a phase she’s going through?

Based on your present knowledge of eating disorders, and cognizant of the behaviors of adolescents, how will you answer your friend?

**REFERENCES**


PART IV

Diet Therapy and Childhood Diseases

Chapter 23  Principles of Feeding a Sick Child
Chapter 24  Diet Therapy and Cystic Fibrosis
Chapter 25  Diet Therapy and Celiac Disease
Chapter 26  Diet Therapy and Congenital Heart Disease
Chapter 27  Diet Therapy and Food Allergy
Chapter 28  Diet Therapy and Phenylketonuria
Chapter 29  Diet Therapy for Constipation, Diarrhea, and High-Risk Infants
CHAPTER 23

Principles of Feeding a Sick Child

Time for completion
Activities: 1 hour
Optional examination: ½ hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:

1. Describe the principles of diet therapy as they apply to sick children.
2. List the major factors that influence the recovery of a sick child.
3. Identify the causes of inadequate nutrient intake in sick children.
4. Assess the nutritional status of a sick child using the accepted standard guidelines.
5. Identify behavioral patterns of the hospitalized child that may interfere with nutrient intake.
6. Describe the measures by which the health team can facilitate a child’s recovery from illness.
7. Discuss ways to involve caregivers in the nutritional treatment of a child who is chronically or terminally ill.
8. Explain ways in which a child and his or her caregivers can be encouraged to comply with a modified diet regime.
9. State measures by which the nutrient intake of a sick child can be improved.
10. Identify the conditions for the use of special dietetic products.
Glossary

Anorexia: lack of appetite.
Assessment: to evaluate medical conditions including nutritional status. Other definitions are possible. See Chapter 8.
Casein: milk protein.
Handicap: permanent loss of physical, sensory, or developmental ability (such as mental retardation, behavior disorder, or learning disability).
Lactose: milk sugar.
Low residue: low fiber and other undigestible materials in food. Other definitions are possible. See Chapter 17.
Medium-chain triglycerides (MCT): a form of fat that is better absorbed than regular fats, and used in diseases where there is malabsorption of ingested foods, especially fat.
Metabolic demand: body’s demand for both essential nutrients and other substances related to body chemistry such as lactic acid, water and electrolyte balance, and so on.
Methionine: an amino acid.
Regression: retreat from present level of functioning to past levels of behavior.
Rehabilitation: the restoration of eating abilities to preillness levels.
Steatorrhea: a foamy, light-colored, foul-smelling stool consisting primarily of undigested fats.
Terminal illness: any illness of long or short duration with life-threatening outcome.

Background Information

Diseases of infancy and childhood cause distress to all those concerned with the well-being of children. Managing these conditions requires more care than managing similar conditions in adults. Children are particularly vulnerable because their mental and physical development may depend on the proper treatment. Diet and nutritional therapy can play an important role in the full recovery of a sick child.

In spite of advances in pediatric nutrition, we cannot define the absolute nutrient requirements of a child at a particular age. The latest published RDAs/DRIs serve as convenient guidelines, but they do not necessarily correspond to the optimal quantities for children. However, for practical purposes, it is generally agreed that a diet meeting the RDAs/DRIs and based on the basic food groups satisfies the nutritional needs of all growing children. The diet should also be appropriate to a child’s age and stage of development. This type of diet is satisfactory for normal and sick children. Details on diet planning are presented in Chapter 1.

Nearly all principles of diet therapy that apply to a sick adult also apply to a young patient. For example, pertinent factors for both groups of patients include personal eating patterns, individual likes and dislikes, and the necessity of frequent diet counseling during a hospital stay. Both children and adults, when ill, encounter the same difficulties in eating well: fatigue, vomiting, nausea, poor appetite, pain from the disease or treatment, drowsiness from medications, fear, anxiety, and so on. Just as with adult patients, the emotional, psychological, social, and physical needs of sick children require careful consideration. In some cases, these may be as important as the attention devoted to the clinical management of the ailment. In general, the principles of feeding a normal child apply more strictly to a sick child.

The nutritional and dietary care of a sick child depends on a number of factors:

1. The disease type, severity, and duration
2. The management strategy (such as the onset of symptoms, the treatment method)
3. The child’s age and growth pattern
4. The nutritional status of the child before and during hospitalization
5. The need for rehabilitation

The major reasons why sick children do not have adequate nutritional intake include the following:

1. A malfunctioning gastrointestinal system
2. High metabolic demands from stress and trauma such as fever, infection, burns, or cancer
3. Excessive vomiting and diarrhea
4. Neurological and psychological disturbances that interfere with eating, such as the inability to chew or the fear of food
5. Specific nutritionally related diseases such as disorders of the kidney, liver, or pancreas

Sometimes a child’s failure to eat cannot be traced to any specific reason.

As in the case of an adult patient, the evaluation of the nutritional status of a hospitalized child should include the following tools whenever feasible:

1. Anthropometric measurements: height (length), weight, head circumference, appropriate measurements of the arms, chest, and pelvis, and skin-fold thickness
2. General body signs: muscle tone, activity, movement, posture, condition of the hair, mouth (teeth and gums), skin, ears, eyes
3. Laboratory studies: blood and urine analyses and bone growth assessment using X-rays

There are other considerations that may have an indirect effect on the child’s nutritional well-being such as secondhand smoke, lead poisoning, pre- and postnatal cares, and so on.
CHAPTER 23 PRINCIPLES OF FEEDING A SICK CHILD

PROGRESS CHECK ON BACKGROUND INFORMATION

FILL-IN
1. List five illness factors that interfere with adequate nutrient intake.
   a. _______________________________
   b. _______________________________
   c. _______________________________
   d. _______________________________
   e. _______________________________

2. List the three most commonly used guidelines for evaluating nutritional status.
   a. _______________________________
   b. _______________________________
   c. _______________________________

TRUE/FALSE
Circle T for True and F for False.
3.  T  F The principles of diet therapy apply to children as well as adults.
4.  T  F Diet therapy is based upon a balanced normal diet.
5.  T  F The physical needs of the ill child should take precedence over his or her psychosocial needs.

MULTIPLE CHOICE
Circle the letter of the correct answer.
6. The major reasons for development of malnutrition in sick children include all of these except:
   a. increased metabolism.
   b. interferences with digestion and absorption.
   c. constipation.
   d. refusal to eat.
   e. _______________________________

7. The dietary care of a sick child is formulated by using:
   a. the diagnosis of the disease.
   b. the treatment of choice.
   c. evaluation of previous and present nutritional status.
   d. all of the above.

ACTIVITY 1:
The Child, the Parents, and the Health Team

BEHAVIORAL PATTERNS OF THE HOSPITALIZED CHILD

Problems that adult patients have in adjusting to hospitalization are more acute among children. Children are exposed to a totally new environment without the comfort of their parents, especially the mother, and this emotional stress is superimposed upon that caused by the clinical condition. Children may also be frightened by particular treatments and anxious about their outcome. The presence of strangers may also be confusing. Hospitalized children who become psychologically maladjusted may be unable to express themselves well. They need someone whom they trust and can talk to, especially when they have eating problems. In fact, some sick children develop certain undesirable eating habits. On the other hand, for some children with adjustment problems, food is the principal enjoyment.

Quite often children readopt some elementary feeding practices that do not fit their age or stage of development. For example, an older child may ask for a bottle instead of accepting a cup and may refuse to eat chopped foods, preferring liquid or pureed foods. Although fully capable of self-feeding, the child may want to be fed. Some children find reasons to reject food, even if it is their favorite item and served in a familiar manner. They may complain about the size of the portion or the flavor of the food. Some older children may either refuse to eat or eat too much. To help avoid these problems, new routines and ways of eating should not be forced upon these children. Old eating habits should be accommodated when possible.

The degree of feeding problems depends on the age of the child, the disorder, the child’s past experience and nutritional status, and the child’s social and emotional makeup. Many young patients are cooperative and eat well.

TEAMWORK

To provide optimal nutritional and dietary care for a sick child, the health team, especially the nurse, dietitian, or nutritionist, must like children and be willing to work with them. For example, the nurse becomes familiar with a child’s eating habits, preferences, reactions, and remarks about food. Conveying this information to the dietary staff helps them to prepare meals that the child will like. Of course, the parents, especially the mother, can provide much useful information about a child’s eating habits. The health team must also occasionally yield to children’s unreasonable demands, especially those of terminally ill children.

The nurse probably plays the most important role in ensuring that a child eats the foods that are served. When the nurse relates to the child and is considerate and attentive, the child is most likely to eat well. The nutritionist, dietitian, and doctor depend on the nurse for coordination and provision of optimal dietary care.

In hospitals where dietitians have many other responsibilities, the suggestions, observations, and opinions of the nurses are especially appreciated. A skillful and
Considerate nurse can help a child to recover more quickly. Apart from ensuring an adequate intake of food, the nurse monitors the fluid consumption of the child and alerts the doctor and dietitian if the intake is poor.

In caring for a sick child, the health team must be fully aware of the anxiety and concern of the parents. Whenever feasible, members of the team should grant parents’ requests for additional visiting hours, thereby helping to fulfill the needs of both the parents and the child. Because their child is ill, both parents have a desire to talk with someone knowledgeable about the illness. The nurse, dietitian, or nutritionist should serve as the contact. If the parents want to help in the feeding of their child, they should be encouraged to do so and become members of the health team. Further, the team should keep the parents well informed if they are unable to attend to their child. Parents are likely to be depressed when their child is suffering from a terminal illness, and in these instances the team should involve them in the different facets of clinical care, especially the feeding routine.

In sum, the health team shares the problems of the patient with the family and helps the family to overcome psychological and emotional distress. The parents should be taught to care for the child, and it is important that they trust the doctor and other health personnel. Under some circumstances (such as when the child suffers kidney disease, brain damage, or other special disorders) the team, especially the nurse, can assist the family in obtaining applicable financial aid.

It is very important that the child and parents are counseled together on the child’s nutrition and dietary care. Sharing information and experience is important—merely instructing the parents without explanation is not sound nutritional education. During hospital feedings, the nurse can make helpful observations about the parent and child; for example, is the parent forcing the child to eat? How extensive are the child’s feeding tantrums and food manipulation? While the child is in the hospital, the parents should be fully informed of the child’s progress and adjustment, especially in regard to nutrition and feeding. The mother should implement recommended changes in eating routines after the child has returned home.

**Nursing Implications**

These nursing implications are applicable to all types of illness in children. Specific measures may be required for specific disorders.

1. Identify eating patterns, such as amounts, times, types of food, ethnic, cultural, and religious observances.
2. Make thorough initial physical assessments and monitor height, weight, and other pertinent data regularly.
3. Calculate caloric, fluid, and nutrient intake, and thoroughly document these. Alert health team members of changes as necessary.
4. Involve the child, parents, and caregivers in feeding and care.
5. Explain all modifications of diet.
6. Give emotional support to the parents of ill children.
7. Establish a relationship of trust with both the parents and the child.
8. Allow for regression during periods of illness.
9. Use play as a teaching strategy when a child’s condition permits.
10. Encourage interaction with other children.
11. Help the child to feel safe in the strange and new environment of a hospital.
13. Provide educational opportunities.
14. Realize the stressors of each age group.
15. Provide the assistance needed for coping with illness or injury.
16. Accept the child’s (and parents’) negative reactions.
17. Allow choices in food whenever possible.
18. Be honest; for example, don’t say, “It will make you well,” when it won’t.
19. Praise the child when the child does the best he or she can.
20. Expect success; convey the impression to the child that you are confident that the child can eat what he or she needs.
21. Assist in securing financial support and referrals when necessary, such as to state and local agencies and social services.

**Progress Check on Activity 1**

**Fill-in**

1. List five factors that may interfere with adequate food intake in hospitalized children.
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
   e. ____________________________

2. Describe the nurse’s primary role as a member of the health team in the feeding of sick children.
   ____________________________
   ____________________________
   ____________________________
3. List 10 measures that nurses should implement to promote good nutrition in the ill child.

a.

b.

c.

d.

e.

f.

g.

h.

i.

j.

ACTIVITY 2:

Special Considerations and Diet Therapy

SPECIAL CONSIDERATIONS

When children are required to eat a modified diet, they may have to be reeducated about eating practices. To do this, the health team must first become familiar with the children’s normal ways of eating, upon which the appropriate dietary changes must be based. If a child’s hospital stay is long, the nutritional education program may be more aggressive and systematic. Depending on the child’s age, teaching aids such as movies, slides, and skits may be used. At the beginning of diet modification, children should be given as much freedom as possible in food selection so that they can adjust to the new nutritional environment. Some children like familiar foods such as peanut butter sandwiches, hamburgers, french fries, puddings, milk, soft drinks, and cookies. If a child is expected to be hospitalized for only a short time and has neither a fluid nor electrolyte imbalance, it may be advisable for the child to eat his or her favorite foods even if they are not nutrient dense. When the child is recovering, the missing nutrients can be made up. A sick child should not be forced into new situations at mealtime, such as having to eat new foods or having to eat foods cooked in an unfamiliar way. Using different utensils than the child is accustomed to and serving a combination of new and familiar foods should also be avoided. A child’s attitude toward any change in dietary routine should be carefully noted.

As indicated earlier, a sick child’s food preferences should be noted by members of the health team and the parents. It is also advisable to put the list in writing. Children of ethnic origins may require special foods and food preparation. However, even when these preferences are taken into account, a child may find all food served in the hospital undesirable. The child is most likely comparing hospital food to food at home, at fast-food chains, or food served in school. Although the food choices for a sick child are invariably limited, it is extremely important to try to select a diet that has familiar foods that the child will readily eat. Whenever a child does not eat, the reasons should be ascertained and new techniques or approaches found for feeding. The child may simply have a poor appetite or be too sick and anxious to eat. Different methods of food serving may be used, including tube and intravenous (IV) feedings. The oral feeding of a hospitalized child should never be forced. Avoid stern commands such as “Drink your milk,” “Eat your fruits and vegetables,” “There must be no food left on the plate,” and “There will be no dessert until you have finished eating your meat and potatoes.” When a child does not eat all the food on the plate, it may mean that the serving size was too large.

Regular hospital procedures such as replacing dressings, giving baths, drawing blood, IV adjustments, drainage, or blood pressure measurements should not interfere with mealtimes. The child should not be exposed to pain or physiotherapy while eating.

Whether a child is sick or well, he or she must eat appropriate amounts and kinds of food. Any nutritional problem may become severe if a child is ill for an extended period of time. Ensuring that a child with a lengthy illness eats a proper amount of food is always a problem demanding constant attention.

There are several ways to improve a child’s eating and acceptance of foods. The child can become involved in the food-selection process by being provided with a selective menu, cafeteria-style food service, fast-food counter food service, or a play-setting food service. Children love to get involved and will eat what they have chosen.

Children, (especially anorexic children), generally prefer certain eating practices. First, they like small, frequent meals. Second, they like to eat family style or in groups (especially with other sick children of the same age). Sometimes the dietetic staff can save time by serving all young sick children in one place and at one time. Third, children like to be fed by their parents.

A child’s food intake may be improved by:

1. Providing a cheerful eating environment (such as a room having attractive draperies, comfortable chairs and tables, and pleasing paintings), especially when meals are served in a dining room.

2. Serving tasty, attractive foods, using creative menu planning and food-preparation techniques for children with such preferences.

3. Using occasions such as Christmas, Thanksgiving, Halloween, Easter, and birthdays to give surprise parties, which can improve appetites.
DIET THERAPY AND DIETETIC PRODUCTS

The routine house diets (liquid, soft, and so on) described in Chapter 14 are also applicable to children. Many therapeutic diets (for treating diabetes, kidney problems, heart problems, and so on) used to treat adult diseases are also used with children, although some modifications may be necessary. There are a number of home and commercial formulas and diets that are used to feed infants, children, and even adults. Commercially, many companies distribute such formulas to feed infants and children with clinical problems such as low birth weights and a number genetic disorders. Perhaps, the three best known companies specialized in such products are: Mead Johnson, Abbot Nutrition, and Wyeth. Their respective Web sites are: www.meadjohnson.com, www.abbotnutrition.com, and www.wyeth.com. Space limitation does not permit a listing of all relevant products. Table 23-1 presents clinical indications for the use of special dietetic products, examples, and the companies manufacturing them.

To obtain details for such products, the Web sites of the companies are the best resource.

DISCHARGE AND HOME NUTRITIONAL SUPPORT

Planning for home care begins with the decision that the child requires nutrition support at home. Discharge planning is a combined effort of physician, nurse, dietitian, manager, providers of services and supplies, and the company or public agency responsible for payment. Home nutrition supports consist of oral, enteral (tube), and/or parental feedings. Oral feeding is simpler and less complicated. The other two supports require training of the patient and care provider and arrangement for home supplies and services. We will discuss some basic considerations in planning and training for home enteral or tube feedings (HEN).

Many members of the healthcare team, including the hospital dietitians, floor nurses, home care nurses, and outpatient dietitians, provide teaching to the patient and caregiver. A simple checklist may resemble the following*:

### General Principles
1. Disease process and why HEN is needed
2. Formula type and feeding schedule
3. Clean technique, hand washing, cleaning utensils
4. Preparation and storage of formula, including measuring formula and additives, and mixing formula

### Specific feeding Techniques
1. Preparation of each feeding:
   a. Setting up and filling feeding set
   b. Checking tube placement and gastric residuals
2. Operation of pump
3. Administration of feeding:
   a. Patient position
   b. Flushing the tube
   c. Care of tube and equipment
   d. Skin care

### Problem Solving, Monitoring, and Complications
1. Pump, alarms, feeding set
2. Gastrointestinal symptoms
3. Clogged tube
4. Displaced tube, aspiration, peritonitis
5. Nutritional status
6. Blood sugar increase or decrease
7. Fluid balance, intake and output, weight


### TABLE 23-1 Indications for the Use of Commercial Formulas: A Partial Listing

<table>
<thead>
<tr>
<th>Indications</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For Healthy Normal and Premature Infants</strong></td>
<td></td>
</tr>
<tr>
<td>Normal infants</td>
<td>Enfamil (Mead Johnson), Similac (Abbot Nutrition)</td>
</tr>
<tr>
<td>Low birth weight infants</td>
<td>Enfamil (Mead Johnson), SMA Premie (Wyeth)</td>
</tr>
<tr>
<td><strong>For Infants with Clinical Disorders</strong></td>
<td></td>
</tr>
<tr>
<td>Allergy</td>
<td>ProSobee (Mead Johnson), Isomil (Abbot Nutrition)</td>
</tr>
<tr>
<td>Electrolyte solutions</td>
<td>Rehydrate (Abbot Nutrition), Resol (Wyeth)</td>
</tr>
<tr>
<td>Fat malabsorption</td>
<td>Portagen (Mead Johnson)</td>
</tr>
<tr>
<td>Inborn errors of metabolism</td>
<td></td>
</tr>
<tr>
<td>Amino acids</td>
<td>Phenyl-Free 1 (Mead Johnson)</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>ProSobee (Mead Johnson)</td>
</tr>
<tr>
<td>Solute regulated</td>
<td>SMA (Wyeth)</td>
</tr>
</tbody>
</table>
8. Assessment of skin at tube site
9. When to call nurse, nutritionist, and/or physician

Space limitation does not permit detailed discussion of other aspects of home nutrition supports.

**NURSING IMPLICATIONS**

The responsibilities for nurses treating a sick child are as follows:

1. Educate the parents and the child in the use of a modified diet.
2. Do not change harmless eating habits or lifestyles.
3. Base dietary instruction on the child’s developmental stage, ability, readiness to learn, and appropriate teaching aids.
4. Make changes slowly, noting and documenting responses.
5. Understand the role of a nurse as the liaison or activities coordinator among the child, caregiver, physician, dietitian, and other health personnel. Be aware that proper coordination assures a well-nourished child.
6. Document reasons for noncompliance, implementation of new strategies, and any dietary revision.
7. Adjust drug administration and treatment or therapies to avoid interference with mealtimes.
8. Relieve nausea and/or pain before meals are served.
9. Use mealtimes for teaching or socializing with other children.
10. Encourage the child to become involved in his or her own care and selection of foods.
11. Provide a clean and cheerful environment for eating.

**Progress Check on Activity 2**

**Situation**

Allen, age 5, is admitted to the hospital with severe burns. He will be in the hospital several weeks. He is withdrawn and eating poorly, and appears very thin. Based on this information, complete the following (use a separate sheet of paper for your responses):

1. Describe data you would collect regarding his eating habits and general nutritional status.
2. Compare nutrient increases needed to the normal growth and development needs of a 5-year-old.
3. List the general diet therapy appropriate for Allen and give rationale.

4. Write a 1-day menu, including snacks, that fit the diet therapy requirements.
5. Allen’s previous eating habits have not been ideal and hospitalization has made them worse. Discuss several ways to improve his intake.

**REFERENCES**


CHAPTER 24

Diet Therapy and Cystic Fibrosis

Time for completion
Activities: 1 hour
Optional examination: ½ hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:

1. Explain the development of cystic fibrosis:
   a. Incidence/organ involvement
   b. Diagnosis
   c. Clinical manifestations
   d. Symptoms
   e. Prognosis
   f. Treatment

2. Provide the guidelines for dietary management of cystic fibrosis:
   a. Identify the nutritional needs of the patient.
   b. List the nutritional treatment goals.
   c. Describe the diet therapy and rationale for the modification.
   d. Explain at least three methods of improving nutrient intake.
   e. Instruct the child and the family regarding food selection and use of pancreatic enzymes.
   f. Provide adequate support and guidance to the patient’s family.
CLINICAL SYMPTOMS AND DIAGNOSIS

If the affected child is not treated, overt symptoms occurring during the first year may include any or all of the following:

1. Frequent, large bowel movements with foul odor
2. Substandard weight gain even with good appetite
3. Abdominal bloating
4. Moderate to severe steatorrhea, with stool fat about three to five times normal
5. Frequent and excessive crying
6. Potential sodium deficiency and circulatory collapse resulting from an excessive salt loss in sweat (especially in hot weather)
7. Frequent episodes of pneumonia characterized by coughing and wheezing

This last symptom by itself can indicate cystic fibrosis. At present, the proper diagnosis of a child with cystic fibrosis is determined from clinical symptoms, the level of sodium chloride in the sweat, and X-rays of the chest.

About 8%–12% of CF patients are diagnosed at birth because of a bowel obstruction (meconium ileus) caused by a thickened meconium. There is now a blood-screening assay test that can be done on newborns. The Cystic Fibrosis Foundation (CFF) has approved this method. The diagnosis is confirmed by two positive sweat tests that measure the electrolyte chloride concentration in the body perspiration. A drug, pilocarpine, is given to stimulate perspiration, and the perspiration is collected on a gauze and measured for electrolyte concentration. A chloride measurement of 60 mmol/l is considered positive for CF. This early diagnosis is helpful, since the proper nutritional and dietary care can be instituted early to prevent suffering from undernourishment. In addition, other appropriate medical treatments can be administered. At the time of this writing, improved medical management has permitted an increasing number of patients to survive to adulthood, especially males.

PROGRESS CHECK ON BACKGROUND INFORMATION

FILL-IN

1. List five symptoms of cystic fibrosis that may be observed during the first year of the child’s life.

   a. __________________________________________________________________________
   b. __________________________________________________________________________
   c. __________________________________________________________________________
   d. __________________________________________________________________________
   e. __________________________________________________________________________
MULTIPLE CHOICE
Circle the letter of the correct answer.

2. The clinical manifestations of cystic fibrosis include all except:
   a. pulmonary infections, malabsorption, and malnutrition.
   b. coronary heart disease, acidosis, and tuberculosis.
   c. failure to thrive and electrolyte imbalance.
   d. steatorrhea, bloating, and circulatory collapse.

3. The three determinations that are made for proper diagnosis of cystic fibrosis are:
   a. chest X-rays, stool cultures, and anthropometric measures.
   b. clinical symptoms, sweat test, and chest X-rays.
   c. saliva test, sweat test, and CAT scan.
   d. all of the above.

4. Which of the following indicators, when present at birth, leads to the diagnosis of cystic fibrosis?
   a. excessive sodium chloride in the sweat
   b. excessive crying and wheezing
   c. meconium ileus
   d. steatorrhea

ACTIVITY 1:
Dietary Management of Cystic Fibrosis

NUTRITIONAL NEEDS AND GOALS OF DIET THERAPY
The nutritional needs of the cystic fibrosis patient must include the following considerations:

1. The problem of recurrent infection is accompanied by defective gastrointestinal functions, increasing the child’s nutritional needs.
2. The child needs a working immune defense system for survival. An adequate supply of essential nutrients is necessary to assure sufficient production of antibodies and phagocytic activity of white blood cells.
3. The child suffers from severe malabsorption because of a lack of three pancreatic enzymes: lipase, trypsin, and amylase.

Children with uncontrolled cystic fibrosis have a typical profile. They have a retarded body weight for their age and height, with occasional arrested growth. They are undersized, with a bloated belly and wasted arms and legs, and they appear malnourished. Early diagnosis and management can restore body size and the deposition of muscle and fat. This allows the children to regain a normal appearance, although sexual development may be delayed. However, complete recovery is possible in some cases.

The goals of diet therapy in cases of cystic fibrosis are the following:
   1. Improve fat and protein absorption.
   2. Decrease the frequency and bulk of stools.
   3. Increase the body weight.
   4. Control or prevent rectum prolapse.
   5. Increase resistance to infection.
   6. Control, prevent, or improve associated emotional problems.

General feeding techniques may be used in feeding these children.

USE OF PANCREATIC ENZYMES
Improvements in pancreatic enzyme replacements have greatly benefited the CF child. The new ones are enteric-coated “beads” encased in a capsule. The beads are pH sensitive, dissolving only in an alkaline pH of 6 or more (normal intestinal pH). They will not dissolve in the stomach (which has a pH of 2). Viokase, Catayz, and Pancrease are the most commonly used. They enable the child to eat normally, as the enzyme dosage is large enough to prevent malabsorption. Children under age 10 take the enzyme before meals; older children may take it before or during meals. Infants are given a predigested formula such as Pregestimil. See Table 23-1 (Infant Formulas, Manufacturers, and Uses) for more information.

Enzyme replacement does not always work. Malabsorption may remain because of possible mucosal damage, intestinal gland malfunctioning, and viscid mucous coating the intestinal villi.

GENERAL FEEDING
Feeding a child with cystic fibrosis can be made easier in several ways. Menu planning should be adapted to foods that the child finds acceptable, the clinical condition of the child, and the child’s response to enzyme treatment. With the development of better enzyme replacements, the diet for children with CF has improved. A normal diet, with increases in nutrients to prevent weight loss from malabsorption, is now used. It is increased above the RDAs/DRIs for height-weight for age by 20%–50%, depending on the child’s condition.

Medium-chain triglycerides (MCTs) facilitate fat absorption, and essential fatty acids prevent linoleic acid deficiency. MCTs used in food preparation can increase energy intake, promote weight gain, and reduce fat malabsorption problems.
Protein malabsorption is mild and usually presents no problem. However, in severe cases the child may lose his or her appetite to the extent that the protein deficiency must be treated. Several procedures can increase the total calorie and protein intake.

One of these involves the addition of dry skim milk powder fortified with fat-soluble vitamins to foods prepared for regular meals. This can be done both at home and in the hospital. It is an inexpensive, easy, and effective way to add calories and protein to the diet. Properly timed snacks at home and in the hospital are also effective, if tolerated. However, the use of pancreatic enzymes must be appropriately scheduled to improve the digestion and absorption of these items.

To assist in increasing the protein-energy value of the diet, the child should be provided with supplements:

1. A mixture of MCTs, oligosaccharides (a carbohydrate chain composed of 4 to 10 glucose segments), beef serum, and protein hydrolysates
2. Commercial nutrient-protein solutions such as Pregestimil, Portagen, and Nutramigen
3. Fat and sugar added to foods if the child can tolerate them
4. Water-miscible vitamins A, D, and E given at one to three times the respective RDAs/DRI

The CFF has approved for use a high-fat, high-energy supplement to be given orally to CF patients. An 8-ounce serving of the product contains 450 kcal, 13 g protein, 43 g carbohydrate, and 25 g fat. In addition, it contains 2500 IU vitamin A, 15 mg vitamin E, 200 IU vitamin D, and linoleic acid. These micronutrients are important, as they are deficient due to malabsorption of fats.

In the study conducted by Rettammel, Marcus, et al., with a grant from the CFF, the patients tolerated the supplement well and showed improved nutritional status. The brand name of the product is Calories Plus. The CFF guidelines for use of Calories Plus recommend its use after attempts to increase weight by normal food intake have been unsuccessful. The guidelines also recommend a gradual increase in amounts given to children younger than 10, to determine how well they tolerate the fat content.

If an infant is being treated, nutritional rehabilitation may require 180–210 kcal/kg/day, while the caloric need of an older child may be 80%–110% above the norm for that age group.

Foods that are not tolerated by the child (such as raw vegetables and high-fat items) must be identified. Some cystic fibrosis patients get diarrhea when they eat rich carbohydrate foods such as fruit, ice cream, or cookies. They may be suffering a temporary carbohydrate intolerance when this occurs. Lactase deficiency, which occurs in about 1%–10% of the patients, is to blame. Special formulas that are lactose free can be used for as long as the intolerance persists.

A high ambient temperature may cause a child with cystic fibrosis to lose electrolytes through sweating. Salty foods such as peanuts, potato chips, and other items will alleviate the problem if the foods are tolerated.

**FAMILY INVOLVEMENT AND FOLLOW-UP**

Parents and caregivers involved in the feeding and care of the child with CF will need extensive dietary education and counseling, especially in the use of supplement and enzyme therapy. The child’s family should become involved as early as possible. Merely handing the mother a list of foods is not sufficient dietary education, since it could result in the child being fed a lopsided diet that omits some major food groups. Without appropriate instruction, family members cannot easily make substitutions for various foods (such as for fat), and they may not assess the nutritional intake correctly. Furthermore, concessions may have to be made to the child’s demands occasionally if an appropriate diet is to be implemented effectively.

The dietitian, nutritionist, and nurse must work with the family (especially the primary food provider). The essentials of the Food Guide Pyramid should be taught, as well as techniques of substituting acceptable nutritious replacements for high-fat and poorly tolerated food items. It should be emphasized that dietary planning for a cystic fibrosis child takes into consideration the following factors:

1. The food preferences of the child
2. Appropriate supplements and amounts to be given
3. Changes in appearance
4. Maintenance of a food record for reference so that the nutritional status of the child can be assessed and the nurse or dietitian can make suggestions

A prescheduled procedure (weekly or monthly checkup) should be used to follow up on the progress of a child being treated for cystic fibrosis. An evaluation of nutritional status should be made that includes height, weight, skin-fold measurement, and bone age. The information obtained should then be compared with standard values. Some practitioners recommend continuing this evaluation for five years. The child’s dietary intake and the nutritional education of the family should also be assessed. If the condition of a child who has been feeling well and who has had a good appetite should suddenly deteriorate, immediate investigation and referral is necessary. Complications such as infection or the ineffectiveness of the diet may cause sudden changes. Arrangements can be made so that such evaluations, assessments, investigations, referrals, and emergency handling can be done by a clinic, family physician, or other health professional (nutritionist, dietitian, nurse, or public health worker).
NUTRITIONAL AND DIETARY MANAGEMENT AT DIFFERENT STAGES OF CHILDHOOD

Infant
1. Pancreatic enzymes are given an hour or so before feedings, milk or otherwise.
2. Depending on the clinical status, initial feedings may include milk (breast or formula). Special commercial formula may also be used, including Alimentum (Ross) or Pregestimil (Mead Johnson).
3. Vitamins may be added as supplements.
4. A source of fluoride may be needed.
5. Extra salt will be needed as determined by the extent of perspiration.
6. Standard solid foods are introduced as recommended for normal infants. If high-calorie feedings are needed, design meal plans accordingly. Also consider the special need for salt.
7. Participation in available community programs is essential. Appropriate public and private programs such as WIC (Women, Infants, Children) programs, well-baby clinics, clinics for children with special needs, and special county programs for cystic fibrosis children may be available.

Toddler
1. Continue with normal prescription of pancreatic enzymes.
2. Inform parents about the reduction in growth and appetite.
3. Offer standard age-designed diets for normal toddlers.
4. Schedule regular meals and snacks.
5. Discourage sweetened beverages and constant snacking.
6. Continue vitamin and fluoride supplements if indicated. Consider the need for high salt intake.
7. Continue participation in community programs.

Age Groups: Preschool, Child Care, and School
1. Provide a normal diet for age groups when at home. Discourage sweetened beverages and continue vitamin supplements if indicated.
2. Continue with prescribed consumption of pancreatic enzymes.
3. When at child care center or schools, note the following:
   a. Parents have no control over what the child eats.
   b. For most children, inform the care provider or school of the special nutritional and dietary need.
   c. In most cases, the prescribed diet should be high in calories, protein and salt.

Adolescent
This age group is independent and can usually take care of their nutritional and dietary needs at home or at school. However, note the following:
1. If applicable, they should learn to prepare easy high-calorie foods.
2. Part of the calories may come from snacks and/or fast foods.
3. Limit sweetened beverages.
4. They should learn, preferably from the health professions, about the significance of:
   a. High caloric take
   b. Pancreatic enzymes preparation
   c. Vitamin and salt supplements
   d. Growth spurt for adolescents and preadolescents

NURSING IMPLICATIONS
The responsibilities of the nurse for treating a child with cystic fibrosis are as follows:
1. Maintain adequate nutrition:
   a. Provide diet high in carbohydrate and protein; supplement diet to increase intake.
   b. Provide altered forms of fat as necessary.
   c. Assure adequate salt intake.
   d. Administer pancreatic enzymes with meals and snacks.
   e. Administer water-soluble vitamin and iron supplements.
2. Promote growth and development by encouraging optimal nutrition.
3. Provide support to the family, including references, resources, support groups, and counseling.
4. Educate the child and the family:
   a. Provide accurate information regarding diet and rationale.
   b. Teach the use of and proper administration of pancreatic enzymes.
   c. Promote eating at the table to improve posture and lung expansion.
   d. Encourage good dental hygiene; cystic fibrosis children may have unhealthy teeth because of deficiencies in nutrition.
   e. Encourage high fluid intake to assist in liquefying secretions.
   f. Encourage optimal nutritional status as a means of preventing rectal prolapse.
   g. Employ strategies to improve child's appetite.
Situation

Susie is a 10-year-old girl with cystic fibrosis who is hospitalized with a severe upper respiratory infection. She has poor muscle development and tires easily. She is 42 inches tall and weighs 50 pounds. Based on your knowledge of growth and development patterns in children and the etiology of cystic fibrosis, answer the following questions:

1. Are Susie’s height and weight appropriate for her age? Explain. ____________________________

2. Susie has chronic diarrhea, and is acting lethargically. To what factors would each of these deviations be attributed? ____________________________

3. List the diet modifications and the reasons they are necessary for restoring adequate nutrition to Susie. ____________________________

4. Susie’s appetite is very poor. List several things you can do to tempt her to eat. ____________________________

5. Outline a day’s food plan for Susie. Check the amount of protein and calories by calculating the total food values. ____________________________

References


CHAPTER 25

Diet Therapy and Celiac Disease

Time for completion
Activities: 1 hour
Optional examination: ½ hour

OBJECTIVES

Upon completion of this chapter, the student should be able to do the following:

1. Describe the etiology of celiac disease.
2. Explain the role of gluten in the pathophysiology of celiac disease.
3. Identify the sources of gluten.
4. Plan a gluten-free diet.
5. Provide adequate substitutes in the diet that enable the individual with celiac disease to meet his or her RDAs/DRI.
6. Teach parents or caregivers the specifics of dietary control and methods of dietary compliance.
7. Alert adults with celiac disease of the necessity of strict adherence to the diet and methods of dietary compliance.

GLOSSARY

Atrophy: decrease in size of a developed organ or tissue; wasting.
Cheilosis: cracking open and dry scaling of the lips and angles of the mouth.
Emaciation: a wasted condition of the body; excessively lean.
Enteropathy: any disease of the intestine, such as celiac disease.
Glossitis: inflammation of the tongue.
Hyperosmolarity: abnormally high (increased) concentration of a solution.
Jejunum: part of the small intestine that extends from the duodenum to the ileum of the intestine; jejunal: of, or relating to the jejunum.
Lumen: the cavity or channel within a tube or tubular organ, as in blood vessel or intestine.
Macrocyclic anemia: anemia marked by abnormally large red blood cells.
Microcyclic anemia: anemia marked by abnormally small red blood cells.
Villi: threadlike projections covering the lining of the small intestine and serving as sites for the absorption of nutrients.

BACKGROUND INFORMATION

Part of the information in this chapter has been modified from the fact sheet on celiac disease distributed by the National Institute of Health (www.nih.gov).
Celiac disease results from a patient’s sensitivity to a flour protein (gluten). Flour is made up of about 10% protein. Celiac disease has many names: gluten (or gluten-induced) enteropathy, nontropical sprue, and celiac sprue. This disease tends to run in families.
A jejunal biopsy of a patient with celiac disease invariably shows mucosal atrophy of the small intestine. The cells, instead of being columnar, are squamous (flat). These abnormal cells secrete only small amounts of digestive enzymes. Villi are also lacking in the intestine.
Medical records indicate that before the cause of celiac disease was identified, only children were suspected to have this disease. At present, adults with symptoms and positive identification from intestinal biopsy are classified as having adult celiac disease, especially if they respond to gluten-free diets.
Apart from using the references at the end of this chapter to find more details on celiac disease, the private organizations list below are an excellent source for details on the disorder.
1. Celiac Disease Foundation. www.celiac.org
2. Celiac Sprue Association/USA Inc. www.csaceliacs.org

ACTIVITY 1:
Dietary Management of Celiac Disease

SYMPTOMS
The symptoms exhibited by a patient with celiac disease are diarrhea, steatorrhea, two to four bowel movements daily, loss of appetite and weight, emaciation; and in children, failure to thrive (such children typically have “pot bellies”). Children’s growth is retarded because of the incompetent mucosa, which causes severe malabsorption. When the fat is not absorbed, it is moved to the large intestine and becomes emulsified by bile and calcium salts. The odor of the stool is caused by large amounts of fatty acids. The unabsorbed carbohydrates are fermented by the bacteria in the large intestine, producing gas and occasional abdominal cramps. Hyperosmolarity induces the colon to secrete water and electrolytes into the lumen. The patient may show many malnutrition symptoms, including bone pain and tetany, anemia, rough skin, and lowered prothrombin time. Most adult patients have iron and folic acid deficiencies, with microcytic and macrocytic anemias. Symptoms such as cheilosis and glossitis, caused by water-soluble vitamin deficiencies, may also be present.

Dermatitis herpetiformis (DH) is a severe, itchy, blistering skin manifestation of celiac disease. Not all people with celiac disease develop dermatitis herpetiformis. The rash usually occurs on the elbows, knees, and buttocks. Unlike other forms of celiac disease, the range of intestinal abnormalities in DH is highly variable, from minimal to severe. Only about 20% of people with DH have intestinal symptoms of celiac disease.
To diagnose DH, the doctor will test the person’s blood for autoantibodies related to celiac disease and will biopsy the person’s skin. If the antibody tests are positive and the skin biopsy has the typical findings of DH, patients do not need to have an intestinal biopsy. Both the skin disease and the intestinal disease respond to a gluten-free diet and recur if gluten is added back into the diet. In addition, the rash symptoms can be controlled with medications such as dapsone (4',4'diamino-diphenylsulfone). However, dapsone does not treat the intestinal condition, and people with DH should also maintain a special diet as explained below.

PRINCIPLES OF DIET THERAPY
The basic principle of diet therapy for celiac disease is to exclude all foods containing gluten—chiefly buckwheat, malt, oats, rye, barley, and wheat. The patient’s response to such a regimen is dramatic. A child shows improvement in one to two weeks, while an adult takes one to three months for visible improvement. In either case, symptoms gradually disappear. With the child patient, there is weight gain and thriving, and diarrhea and steatorrhea clear up. The mucosal changes will also return to normal after a gluten-free diet. The degree of improvement is directly related to the extent the patient adheres to the diet. The therapy can be proven to be curing the disease if symptoms reappear when the patient returns to a regular diet.
For most people, following this diet will stop symptoms, heal existing intestinal damage, and prevent further damage. Improvements begin within days of starting the diet. The small intestine is usually completely healed in 3 to 6 months in children and younger adults and within 2 years for older adults. Healed means a person now has villi that can absorb nutrients from food into the bloodstream.

To stay well, people with celiac disease must avoid gluten for the rest of their lives. Eating any gluten, no matter how small an amount, can damage the small intestine. The damage will occur in anyone with the disease, including people without noticeable symptoms. Depending on a person’s age at diagnosis, some problems will not improve, such as delayed growth and tooth discoloration.

Some people with celiac disease show no improvement on the gluten-free diet. This condition is called unresponsive celiac disease. The most common reason for poor response is that small amounts of gluten are still present in the diet. Advice from a dietitian who is skilled in educating patients about the gluten-free diet is essential to achieve the best results.

Rarely, the intestinal injury will continue despite a strictly gluten-free diet. People in this situation have severely damaged intestines that cannot heal. Because their intestines are not absorbing enough nutrients, they may need to receive nutrients directly into their bloodstream through a vein, or intravenously. People with this condition may need to be evaluated for complications of the disease.

Table 25-1 lists those foods that are permitted or prohibited in a gluten-restricted diet. Table 25-2 provides a sample meal plan for such a diet.

PATIENT EDUCATION

After celiac disease has been diagnosed, patients should be educated about its cause and treatment. Patients who understand this illness are much more likely to follow a prescribed diet. They should first be taught that adherence to a gluten-free or gluten-restricted diet is essential. If the patients also have lactose intolerance (as is sometimes the case), the necessity of avoiding milk and milk products must also be emphasized.

Patients should be forewarned of the great difficulty in following a gluten-restricted diet. Buckwheat, malt, oats, barley, rye, and wheat all contain gluten and are extensively used in different food products. Patients must therefore be taught to read all labels on prepared and packaged foods to ascertain if they contain gluten. Gluten-free wheat products are commercially available for those on special diets. In addition, potato, rice, corn, soybean flours, and tapioca may be substituted.

CHAPTER 25 DIET THERAPY AND CELIAC DISEASE

If a patient is already malnourished when treatment begins, an aggressive nutritional rehabilitation regimen should be instituted. This includes high amounts of calories, protein, vitamins, and minerals. It should also provide fluids and electrolyte compensation (with special attention to potassium, magnesium, and calcium). Medium-chain triglycerides (MCTs) should also be included. A gluten-restricted diet may be deficient in thiamin (vitamin B₁) and should include vitamin supplements.

All patients should be taught to plan their menus in accordance with some food guides to achieve their daily RDAs. Health professionals should help the patient in this planning.

NURSING IMPLICATIONS

The responsibilities of the nurse to patients with celiac disease are listed below.

1. Emphasize to parents and child the importance of complying with diet therapy to treat the disease.
2. Explain the disease etiology to the parents, especially the specific role of gluten in the pathophysiology.
3. Advise the patient and parents regarding the necessity of reading all food labels carefully.
4. Explain the necessity of any other restrictions that may be placed on the diet owing to the child’s condition, such as low-residue, lactose-free diets.
5. Recommend that the diet be continued for a lifetime.
6. Provide a gluten-free diet tailored to the child’s appetite and capacity to absorb; emphasize suitable substitutes.
7. Arrange for conferences with the dietitian, caregiver, child, and nurse to coordinate care.
8. Administer aqueous vitamin-mineral supplements as ordered; request prescription for supplements if child’s intake is poor.
9. Monitor fluid and food intake carefully, and document well.
10. Teach parents or caregivers specifics of dietary control; provide a written list of common food sources of gluten.
11. Emphasize other dietary principles, such as high-calorie, high-protein, low-residue diets.
12. Emphasize the importance of good health in preventing infections, the dangers of fasting, and drug and food interactions.
13. Make referrals for financial aid or additional dietary counseling, and follow up after patient is discharged.
14. Assist the parents and the child in adjusting to lifelong regimes; be positive about dietary treatment.
15. Recommend the now-available home test kit for gluten detection.
### TABLE 25-1 Foods Permitted and Prohibited in a Gluten-Restricted Diet

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods Permitted</th>
<th>Foods Prohibited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat, poultry</td>
<td>Those prepared without prohibited grains or their flours</td>
<td>All products using prohibited flours, including Swiss steak, chili con carne,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>commercial sausages (e.g., weiners), gravies, sauces, stews, batter, stuffings,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>croquettes</td>
</tr>
<tr>
<td>Fish</td>
<td>All fish and shellfish containing no restricted grains or their flours</td>
<td>Any product made with the restricted grains and flours, e.g., wheat-flour-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>breaded fish sticks and shrimp</td>
</tr>
<tr>
<td>Cheese</td>
<td>All not specifically prohibited</td>
<td>Processed cheese and cheese spread prepared with gluten as a stabilizer</td>
</tr>
<tr>
<td>Eggs</td>
<td>All frozen and fresh eggs and egg substitutes without restricted grains or their flours</td>
<td>All others</td>
</tr>
<tr>
<td>Textured vegetable proteins</td>
<td>All those made from soy ingredients</td>
<td>Malted milk</td>
</tr>
<tr>
<td>Milk, milk products</td>
<td>Milkshakes, milk, cream, buttermilk, plain yogurt, cheese, cream cheese,</td>
<td>Salad dressings thickened with wheat or rye products; cream, butter, white sauce</td>
</tr>
<tr>
<td></td>
<td>processed cheese foods, cottage cheese</td>
<td>made with forbidden flour</td>
</tr>
<tr>
<td>Fats, oils</td>
<td>Butter, margarine, cream and cream substitutes; bacon; olive oil, vegetable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>oil, vegetable oil, salad oil; vegetable (hydrogenated) shortening;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mayonnaise</td>
<td></td>
</tr>
<tr>
<td>Cereals</td>
<td>All cereals made from corn and rice, e.g., Sugar Pops, Rice Krispies, Corn</td>
<td>All cereals containing prohibited grains, e.g., Cream of Wheat</td>
</tr>
<tr>
<td></td>
<td>Chex, Corn Flakes, Puffed Rice, Frosted Flakes, Cream of Rice, grits, hominy,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and cornmeal</td>
<td></td>
</tr>
<tr>
<td>Bread</td>
<td>Muffins, pone, and corn bread prepared without wheat flour; rolls, muffins,</td>
<td>All products made from prohibited grains, e.g., sweet rolls, crackers, muffins,</td>
</tr>
<tr>
<td></td>
<td>and breads prepared with cornmeal, cornstarch, lima bean flour, and arrowroot;</td>
<td>prepared mixes, bread crumbs, commercial yeast breads</td>
</tr>
<tr>
<td></td>
<td>rice pancakes; products made with low-gluten wheat starch</td>
<td></td>
</tr>
<tr>
<td>Vegetables, vegetable juices</td>
<td>All vegetables and juices; sauces made with potato flour or cornstarch may be</td>
<td>Vegetables prepared with cracker crumbs, bread, or cream sauces thickened with</td>
</tr>
<tr>
<td></td>
<td>used</td>
<td>prohibited flours or cereals</td>
</tr>
<tr>
<td>Fruits, fruit juices</td>
<td>All fruits and juices</td>
<td>Fruit sauces thickened with prohibited grains</td>
</tr>
<tr>
<td>Potatoes or substitutes</td>
<td>Potatoes, rice, grits, corn, sweet potatoes, dried peas and beans</td>
<td>Pasta</td>
</tr>
<tr>
<td>Sweets</td>
<td>All unless specifically prohibited</td>
<td>Candies and chocolate syrup with bases made from prohibited grains</td>
</tr>
<tr>
<td>Soups</td>
<td>Cream or vegetable soups thickened with cornstarch or potato flour; meat stock; clear broths</td>
<td>Milk and cream soups; bouillon cubes or powdered soups; canned soups; soups with prohibited grain products; soups thickened with wheat flour</td>
</tr>
<tr>
<td>Beverages</td>
<td>Coffee, tea, cocoa, chocolate, carbonated beverages, milk, Kool-Aid</td>
<td>Ale, beer, malted milk; instant cocoa, coffee, or tea; cereal beverages; milk shakes; others including Ovaltine, Postum</td>
</tr>
<tr>
<td>Desserts</td>
<td>Products made with permitted grains; plain or fruit-flavored gelatin; homemade ice, ice cream, sherbet, Popsicles, cornstarch, rice and tapioca puddings; cakes, pies, and cookies, using water, sugar, and fruits</td>
<td>All products made with prohibited grains, e.g., pastries (cakes), desserts (ice cream cones, sherbet), prepared mixes</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Herbs, pepper, olives, salt, vinegar, catsup, pickles, relishes, spices, sauces prepared from permitted grains and their flours; peanut butter, nuts, flavoring extracts, popcorn</td>
<td>Creamed and scalloped foods; au gratin dishes, rarebit; fritters, timbales, malt products, prepared mixes of all kinds; condiments prepared with gluten base</td>
</tr>
</tbody>
</table>
CHAPTER 25  DIET THERAPY AND CELIAC DISEASE  373

PROGRESS CHECK ON ACTIVITY 1

MULTIPLE CHOICE

Circle the letter of the correct answer.

1. Gluten is found in:
   a. wheat, rye, oats, barley.
   b. rice, potato, corn, beans.
   c. milk and meat.
   d. all of the above.

2. Jane has been diagnosed as having celiac disease.
   Which of the following snacks would be suitable for her to have in nursery school?
   a. malted milk shake
   b. popcorn and apple slices
   c. hot dog with catsup
   d. graham crackers and peanut butter

3. Diet therapy for celiac disease is continued:
   a. indefinitely.
   b. until patient is middle-aged.
   c. through prepubertal growth spurt.
   d. for at least six weeks.

Situation

Mrs. Jones, age 30, was recently diagnosed as having adult celiac disease, and her physician ordered a gluten-free diet. She recognizes you as a health professional and states that she is quite apprehensive about her diet. Counsel her regarding the following:

4. Explain what gluten is and why it is restricted.

5. Because Mrs. Jones works outside the home, she will be eating lunch away from home. Provide lunch suggestions that conform to her diet.

6. Name at least six typical foods containing gluten for Mrs. Jones.

7. List the cereal grains that can be used on Mrs. Jones’s diet.

8. Name at least five hidden food sources of gluten.

---

TABLE 25-2  Sample Meal Plan for a Gluten-Restricted Diet

<table>
<thead>
<tr>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juice</td>
<td>Meat</td>
<td>Meat, fish, or poultry</td>
</tr>
<tr>
<td>Cereal, hot or dry*</td>
<td>Potato</td>
<td>Potato</td>
</tr>
<tr>
<td>Scrambled egg(s)</td>
<td>Vegetable</td>
<td>Vegetable</td>
</tr>
<tr>
<td>Corn bread (special)</td>
<td>Salad with dressing</td>
<td>Juice</td>
</tr>
<tr>
<td>Margarine</td>
<td>Fruit or dessert</td>
<td>Corn bread</td>
</tr>
<tr>
<td>Jelly</td>
<td>Corn bread</td>
<td>Margarine</td>
</tr>
<tr>
<td>Milk</td>
<td>Margarine</td>
<td>Milk</td>
</tr>
<tr>
<td>Coffee or tea</td>
<td>Milk</td>
<td>Milk</td>
</tr>
<tr>
<td>Sugar</td>
<td>Beverage</td>
<td>Beverage</td>
</tr>
<tr>
<td>Cream</td>
<td>Cream</td>
<td>Cream</td>
</tr>
<tr>
<td>Salt, pepper</td>
<td>Sugar</td>
<td>Sugar</td>
</tr>
<tr>
<td></td>
<td>Salt, pepper</td>
<td>Salt, pepper</td>
</tr>
</tbody>
</table>

*From permitted cereals. See Table 22-1.
9. Mrs. Jones states that she is also lactose intolerant. What additional foods must be omitted from her diet?

10. Would you recommend that Mrs. Jones add medium-chain triglycerides to her diet? Explain.

OPTIONAL EXERCISE
Write down all the foods you ate yesterday. Change the menu to make it gluten free.

ACTIVITY 2:
Screening, Occurrence, and Complications

SCREENING
Screening for celiac disease involves testing asymptomatic people for the antibodies to gluten. Americans are not routinely screened for celiac disease. However, because celiac disease is hereditary, family members—particularly first-degree relatives—of people who have been diagnosed may need to be tested for the disease. About 10% of an affected person’s first-degree relatives (parents, siblings, or children) will also have the disease. The longer a person goes undiagnosed and untreated, the greater the chance of developing malnutrition and other complications.

In Italy, where celiac disease is common, all children are screened by age 6 years so that even asymptomatic disease is caught early. In addition, Italians of any age are tested for the disease as soon as they show symptoms. As a result of this vigilance, the time between when symptoms begin and the disease is diagnosed is usually only 2 to 3 weeks. In the United States, the time between the first symptoms and diagnosis averages about 10 years.

According to the NIH, data on the prevalence of celiac disease is spotty. In Italy about 1 in 250 people, and in Ireland about 1 in 300 people, have celiac disease. Recent studies have shown that it may be more common in Africa, South America, and Asia than previously believed.

Until recently, celiac disease was thought to be uncommon in the United States. However, studies have shown that celiac disease is very common. Recent findings estimate about 2 million people in the United States have celiac disease, or about 1 in 133 people. Among people who have a first-degree relative diagnosed with celiac disease, as many as 1 in 22 people may have the disease.

Celiac disease could be underdiagnosed in the United States for a number of reasons:

• Celiac symptoms can be attributed to other problems.
• Many doctors are not knowledgeable about the disease.
• Only a handful of U.S. laboratories are experienced and skilled in testing for celiac disease.

More research is needed to find out the true prevalence of celiac disease among Americans.

COMPLICATIONS
Damage to the small intestine and the resulting problems with nutrient absorption put a person with celiac disease at risk for several diseases and health problems:

• Lymphoma and adenocarcinoma are types of cancer that can develop in the intestine.
• Osteoporosis is a condition in which the bones become weak, brittle, and prone to breaking. Poor calcium absorption is a contributing factor to osteoporosis.
• Miscarriage and congenital malformation of the baby, such as neural tube defects, are risks for untreated pregnant women with celiac disease because of malabsorption of nutrients.
• Short stature results when childhood celiac disease prevents nutrient absorption during the years when nutrition is critical to a child’s normal growth and development. Children who are diagnosed and treated before their growth stops may have a catch-up period.
• Seizures, or convulsions, result from inadequate absorption of folic acid. Lack of folic acid causes calcium deposits, called calcifications, to form in the brain, which in turn cause seizures.

NURSING IMPLICATIONS
Some points in patient counseling:

1. People with celiac disease cannot tolerate gluten, a protein in wheat, rye, barley, and possibly oats.
2. Celiac disease damages the small intestine and interferes with nutrient absorption.
3. Treatment is important because people with celiac disease could develop such complications as cancer, osteoporosis, anemia, and seizures.
4. A person with celiac disease may or may not have symptoms.
5. Diagnosis involves blood tests and biopsy.
6. Because celiac disease is hereditary, family members of a person with celiac disease may need to be tested.
7. Celiac disease is treated by eliminating all gluten from the diet. The gluten-free diet is a lifetime requirement.

**Progress Check on Activity 2**

**TRUE/FALSE**

Circle T for True and F for False.

1. T  F About 10% of a celiac-affected person’s first-degree relatives (parents, siblings, or children) will also have the disease.
2. T  F Celiac disease is usually diagnosed in the first 6 months of life.
3. T  F Gluten is a protein found in rye, wheat, oats, and rice.
4. T  F Celiac disease damages the small intestine and interferes with nutrient absorption.
5. T  F People with celiac disease can develop such complications as cancer, osteoporosis, anemia, miscarriage, congenital malformation of the baby, short stature, convulsions, and seizures.
6. T  F Diagnosis involves blood tests such as antibody tests against gluten and biopsy.
7. T  F Persons diagnosed with celiac disease must stay on a gluten-free diet the rest of their lives.

**FILL-IN**

8. Celiac disease could be underdiagnosed in the United States for a number of reasons:
   a. 
   b. 
   c. 

**REFERENCES**


