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ABSTRACT

Nutrition is well-recognized as a necessary component of educational programs for physicians. This is to be valued in that of all factors affecting health in the United States, none is more important than nutrition. This can be argued from various perspectives, including health promotion, disease prevention, and therapeutic management. In all cases, serious consideration of nutrition related issues in the practice is seen to be one means to achieve cost-effective medical care. These modules were developed to provide more practical knowledge to health care providers, and in particular primary care physicians. This module is designed to familiarize physicians with the current modes of diet therapy in the treatment of gastrointestinal diseases most commonly encountered by primary care physicians. The diseases discussed include peptic ulcer disease, reflux esophagitis, gallbladder disease, lactose intolerance, diverticulosis, Crohn's disease, ulcerative colitis, and irritable bowel syndrome. Included are learning goals and objectives, self-checks of achievement with regard to goals, and references for the physician and for the physician to give to the patient. The appendices include a list of caffeine and theobromine content in selected foods, and a list of the fiber content of selected foods. (CW)

# 13 Dietary Management in Gastrointestinal Diseases

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Nutrition in Primary Care

Department of Family Medicine
The Ohio State University
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## The Nutrition in Primary Care Series Contains These Modules:

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# 13 Dietary Management in Gastrointestinal Diseases

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# 13 Dietary Management in Gastrointestinal Diseases

## Nutrition in Primary Care

## Tables

## Introduction

As a physician, you will treat many patients with gastrointestinal diseases. Diet is one of the treatment parameters for many gastrointestinal diseases, and, therefore, you should be familiar with the rationale for dietary management of patients as well as the acceptable and disallowed foods on these diets.

This module is designed to familiarize you with current modes of diet therapy in the treatment of gastrointestinal diseases most commonly encountered by the primary care physician. The diseases discussed are peptic ulcer disease, gallbladder disease, reflux esophagitis, lactose intolerance, diverticulosis, Crohn's disease, ulcerative colitis, and irritable bowel syndrome.

## Goals

*As a result of this unit of study, you should be able to:*

1. *Prescribe the appropriate diet in the treatment of peptic ulcer disease, gallbladder disease, reflux esophagitis, lactose intolerance, diverticulosis, Crohn's disease, ulcerative colitis, and irritable bowel syndrome;*

2. *Translate the diet order into specific foods which the patient should be instructed to include and not to include in his diet; and*

3. *Identify those situations when the patient should be referred to the clinical dietitian for diet prescription and counseling.*

# Peptic Ulcer Disease and Dietary Management

**The major goals in the medical management of peptic ulcer disease are to reduce the secretion of gastric acid and pepsin, to neutralize the gastric acid which is secreted, to protect the ulcerated area from further irritation, and to promote healing. Dietary management plays an important role in achieving these goals.**

The term *peptic ulcer disease* is used to describe any localized erosion of the mucosal lining of those portions of the alimentary tract that come into contact with gastric juice. The majority of ulcers occur in the first part of the duodenum; gastric ulcers also often occur along the lesser curvature of the stomach near the pylorus.

Although the etiology of peptic ulcer disease is unclear and under investigation, there appear to be three factors involved in its development. These factors follow:

1. Large amounts of gastric acid and pepsin secretion;
2. Decrease in mucosal resistance to gastric acid and pepsin; and
3. High degree of anxiety and emotional stress with internalization of this stress.

The major goals in the medical management of peptic ulcer disease are to reduce the secretion of gastric acid and pepsin, to neutralize the gastric acid which is secreted, to protect the ulcerated area from further irritation, and to promote healing. In addition to antacid and anticholinergic

Table 13–1 American Dietetic Association Position Paper on Bland Diet in the Treatment of Chronic Duodenal Ulcer Disease

I [The ADA] recognizes that the rationale (chemically and mechanically non-irritating) for the bland diet is not sufficiently supported by scientific evidence.

A. Spices, condiments, and highly seasoned foods are usually omitted on the basis that they irritate the gastric mucosa. However, experiments have indicated that no significant irritation occurs, even when most condiments are applied directly on the gastric mucosa. Exceptions are those items which do cause gastric irritation, including black pepper, chili powder, caffeine, coffee, tea, cocoa, alcohol, and drugs.

B. Milk has been the basis of diets for duodenal ulcer for many years. One of the primary aims in dietary management of duodenal ulcer disease is to reduce acid secretion and neutralize the acid present. While milk does relieve duodenal ulcer pain, the acid neutralizing effect is slight. Its buffering action could be overweighed by its ability to stimulate acid production. Most foods stimulate acid secretion to some extent, protein provides the greatest buffering action and is also the most powerful stimulus to acid secretion. The use of milk therapy has been greatly reduced over the past decade, owing to a better knowledge of its side effects and allergic reactions. The controversy regarding the use of milk still continues. There are those who still advocate the regular use of milk, primarily during the active stage of acute duodenal ulcer; however, strict insistence on its use during remission is unwarranted.

C Roughage, or coarse food, has been excluded from the diet on the basis that it aggravates the inflamed mucosal area. There is no evidence that such foods as fruit skins, lettuce, nuts, and celery, when they are well masticated and mixed with saliva, will scrape or irritate the duodenal ulcer. Grinding or puréeing of foods is necessary only when the teeth are in poor condition or missing.

D. The effect of a bland diet on the healing of duodenal ulcer has been studied extensively. Investigations have compared various bland diets with regular or free-choice diets. The results indicate that a bland diet made no significant difference in healing the ulcer. One such study demonstrated that the acidity of the gastric contents was frequently lower when a free-choice diet was taken. Many foods have been incriminated as the cause of gastric discomfort and are subsequently eliminated from a patient's diet. Studies done on patients with and without documented gastrointestinal disease indicate that those with gastrointestinal disease cannot be distinguished by food intolerance. Symptoms of intolerance were more related to individual response than to intake of specific food or the presence of disease.

II Believes that scientific investigation supports the validity of frequent small feedings in the management of patients with duodenal ulcer disease. These have been found to offer the most comfort to the patient; additionally, acidity of the gastric contents is lower with small-volume, frequent feedings. It must also be recognized that rest, preferably in bed, rapidly reduces duodenal ulcer symptoms. This is a specially important factor in the healing of the ulcer.

III. Believes the following points should be of major consideration in developing a dietary plan for duodenal ulcer patients.
   A. Individualization of the dietary plan, since patients differ as to specific food intolerances, living patterns, life styles, work hours, and education.
   B. Utilization of small volume, frequent feedings.
   C. Provision of educational materials relative to dietary support.

IV. Advocates the continued pursuit of current research and recommends that valid information be utilized in up-dating dietary regimens

V. Suggests that dietetic practitioners be cognizant of the possible harmful effects of a milk-rich bland diet in patients who have a tendency towards hypercalcemia and/or atherosclerosis.

Reprinted from the *Journal of the American Dietetic Association*, Vol 59, No 3, September, 1971, The American Dietetic Association.

drugs and cimetidine administration, diet has been a long-standing method of treating the peptic ulcer disease patient.

Several varieties of dietary treatments have been used in the past, varying from a strict milk and cream regimen (the Sippy diet) to a liberal diet as tolerated. To date, there is insufficient evidence to support any one specific diet management program in the treatment of peptic ulcer disease.

**The present bland, no-gastric-stimulant diet restrictions in the treatment of ulcer disease are simple and not highly restrictive. A summary of the recommendations follows:**

1. **Omit known gastric stimulants — regular and decaffeinated coffee, tea, cocoa, chocolate, meat extracts, alcohol, black pepper, chili powder, mustard seed, and nutmeg.**
2. **Provide frequent, small feedings during the acute stage.**
3. **Individualize the diet as the patient requests, but make certain that it supports a well-balanced nutrient intake.**

In understanding the rationale for the dietary management of peptic ulcer disease, a brief discussion of varying nutrients, feeding techniques, and their nutrients' effects on gastric acid secretion is presented.

## Protein

Ingested food which distends the antrum of the stomach causes release of gastrin, which in turn stimulates gastric acid secretion. When protein enters the antrum, it initially buffers gastric acid. Later, however, the products of protein digestion, proteoses and peptones, become major stimulants of gastric acid secretion. In spite of this stimulating effect, protein should be included in the diet of the patient with ulcer disease at a level of at least 0.8 gm per kilogram of body weight. A level of 1.0 to 1.5 gm protein per kilogram body weight may be necessary if the patient has lost blood and blood synthesis is needed. Foods high in iron should be consumed in addition to the high protein intake, and an iron supplement may be prescribed.

## Fat

Fat inhibits gastric acid secretion. This effect may explain in part the favorable effect of feeding a large and frequent amount of milk and cream during the early phase of treating acute peptic ulcer disease. Such treatment is not recommended for prolonged use. The diet for peptic ulcer disease should be moderate in fat.

## Carbohydates

Carbohydrates neither stimulate nor inhibit gastric acid secretion. The inclusion of carbohydrate in the diet is essential to provide an adequate energy intake.

## Roughage and Low-pH Foods

Roughage has been suggested, but not proven, to be a mucosal mechanical irritant. Citrus fruits and low-pH beverages have been suggested, but not proven, to irritate the mucosal lining. With regard to both high-roughage and low pH foods, the best approach appears to be the patient's tolerance. If citrus fruits and juices are not tolerated, an ascorbic acid supplement should be prescribed.

## Gastric Secretagogues

The methyl xanthines (caffeine, theobromine, and theophylline), alcohol, and meat extracts are known gastric acid stimulants. Research has shown that both coffee and decaffeinated coffee are more potent gastric stimulants than caffeine alone.[3,4,18] Because of this finding we have placed both coffee and decaffeinated coffee on the foods-to-avoid list for ulcer patients. However, you should decide whether or not to eliminate decaffeinated coffee on an individual basis when working with specific patients. The caffeine and theobromine contents of selected foods are shown in Appendix A at the end of this module.

Alcohol and aspirin, in addition to their gastric acid stimulating effect, can also cause cellular damage to the mucosal barrier resulting in ulcer formation. Alcohol and aspirin, therefore, should be omitted from the ulcer patient's diet.

Several spices have been suggested as gastric acid secretors or mucosal barrier irritants, but few have been shown to do either. Chili powder, black pepper, mustard seed, and nutmeg have been shown to be gastric irritants in some individuals

Table 13–2 Acceptable and Nonacceptable Foods on a Bland, No-Gastric-Stimulant Diet

| Food Types | Acceptable Foods | Foods to Avoid |
|---|---|---|
| Milk and Milk Products | Use as desired | Chocolate milk |
| Meats, Fish, Poultry, Eggs | Beef, veal, pork, ham, lamb, poultry, liver, fish, eggs, and peanut butter | Highly seasoned meats such as bratwurst and lunchmeats should be avoided if there is discomfort associated with their ingestion. (Some of these foods contain black pepper) |
| Fruits and Vegetables | Use as desired. Fresh, frozen, canned as well as all juices | None, unless citrus juices cause pain to individual patients |
| Breads and Cereals | Use as desired. Enriched breads and cereals, crackers, rice, noodles, and macaroni | None |
| Fats | Use as desired. Butter, margarine, cream, salad dressings, sour cream, bacon, and cooking oils | Spicy salad dressings, such as Italian. (Some of these may contain black pepper, mustard seed, chili powder, nutmeg) |
| Beverages | Cereal beverages and carbonated beverages except cola beverages | Coffee (regular and decaffeinated), tea, cola beverages, cocoa, chocolate drinks, alcoholic beverages |
| Desserts and Sweets | Cakes, pies, pastries, cookies, and others. (Restrict only when kilocalorie restriction is indicated) | Desserts using chocolate or cocoa as an ingredient |
| Miscellaneous Foods | Soups, spices, and condiments as tolerated | Gravies, bouillon, black pepper, chili powder, mustard seed, and nutmeg if not tolerated by the patient |

and, therefore, should be eliminated from the diet. However this should be done on an individual patient basis.

## Size of Meals

Because distention of the antrum stimulates gastric acid secretion, frequent smaller-volume meals may be better than fewer larger-volume meals.[11] This recommendation may be more desirable during the acute phase than during the convalescent phase following healing of the ulcer.[11,16] Controversy exists over the benefit of taking food prior to retiring. Some clinicians advocate snacks to prevent unbuffered acid in the empty stomach,[16] while others discourage bedtime snacks since they may stimulate nocturnal acid secretion.[12]

As will all modified diets, the bland, no-gastric-stimulant diet should be based upon the patient's usual dietary habits. Correction of faulty and irregular eating patterns is recommended to provide an adequate nutrient intake.

The American Dietetic Association (ADA) has published a position paper on the use of the bland diet in the management of ulcer disease. This diet is also appropriate for patients with hiatus hernia, for patients receiving steroid therapy, and for patients recovering from acute gastritis. This excellent paper is included in Table 13–1 as a summary of previously discussed points in the rationale of the bland diet.

Table 13–2 is a summary of foods allowed and foods which should be discouraged on a bland, no-gastric-stimulant diet. This table may be used as a patient handout and discussed with the patient when instruction on the diet's use is warranted.

If a patient desires an example of a well-balanced sample menu for a bland, no-gastric-stimulant diet, the six-meal example in Table 13–3 may be given. If three meals and fewer kilocalories are desired, the three snacks may be omitted, the menu will still be nutritionally adequate.

**Table 13–3** Sample Menu for a Bland, No-Gastric-Stimulant Diet

| | |
|---|---|
| Breakfast<br>Orange juice<br>Toast, butter or margarine<br>Scrambled egg<br>Milk | Morning Snack<br>Milk and crackers |
| Lunch<br>Roast beef sandwich with lettuce and tomatoes<br>Fresh fruit<br>Milk | Afternoon Snack<br>Cheese and crackers<br>Fresh fruit |
| Dinner<br>Roast pork<br>Mashed potatoes with margarine and sour cream<br>Broccoli<br>Tossed salad and dressing (without avoided spices)<br>Fresh fruit or dessert (no chocolate)<br>Milk | Bedtime Snack<br>Half sandwich<br>Milk or fruit juice |

## Test Your Knowledge

Test your knowledge of peptic ulcer disease. Check your answers for the following 2 questions with the suggested answers given at the end of this module.

1. Identify the appropriate dietary management for patients with peptic ulcer disease.

2. Plan a sample day's menu for a patient with peptic ulcer disease.

## Gallbladder Disease and Dietary Management

**Diet for patients with gallbladder disease should be low in fat, which decreases the need for bile secretion and gallbladder function. Small, frequent feedings also appear to be better tolerated by gallbladder disease patients than larger meals. For many patients, a bland diet may also be helpful in decreasing gastrointestinal distress.**

The gallbladder concentrates and stores bile. The release of cholecystokinin by the intestinal mucosa is stimulated by the entrance of fat into the duodenum and forces contraction of the gallbladder thus releasing bile through the common bile duct into the small intestine. Bile acts as a fat emulsifier, thereby facilitating the digestion and absorption of fat. Therefore, any interference with the flow of bile may cause impaired fat digestion, steatorrhea, jaundice, and discomfort.

Cholelithiasis (gallstones), often complicated by cholecystitis (inflammation of the gallbladder), is the most common of the gallbladder diseases. The major symptom of gallbladder disease is acute and intermittent epigastric pain. The patient frequently complains of indigestion, heartburn nausea, and vomiting, which are often precipitated by consumption of fatty and spicy foods.

Severe gallbladder disease is primarily treated by surgery. However, if surgery is not performed, the pain of chronic gallbladder disease can be decreased by limiting the secretion of bile from the gallbladder. This may be achieved by prescribing a low-fat diet with frequent feedings.

For the many patients who complain of heartburn and pain following spicy meals, a bland diet may also be indicated. The rationale for prescribing a bland diet is not well understood, but many patients seem to have less gastrointestinal distress when consuming a bland diet in addition to the low-fat diet. In grossly obese patients, weight loss is indicated prior to surgery if time permits.

Table 13–4 is a summary of foods allowed and foods which should be avoided on a low-fat bland diet. This table may be used as a patient handout and discussed with the patient when instruction on this diet is warranted.

If a patient desires an example of a well-balanced sample menu for a low-fat bland diet, the meal sample in Table 13–5 may be given. If fewer kilocalories are desired, the food at the three snacks could be eliminated, foods at breakfast, lunch, and dinner could be divided into six feedings.

Table 13–4 Acceptable and Nonacceptable Foods on a Low-Fat Bland Diet

| Food Types | Foods Allowed | Foods to Avoid |
|---|---|---|
| Beverages | Cereal, beverages, and carbonated beverages except colas | Coffee, tea, cocoa, cola beverages, alcohol |
| Milk | Skim milk, buttermilk, low-fat yogurt | Whole milk, 2% milk, buttermilk made from whole milk, cream |
| Eggs | No more than 1 egg per day | Fried eggs |
| Cereals | Enriched, cooked, and dry cereals | None |
| Meat and Substitutes | Baked, broiled, roasted,or stewed lean beef, veal, lamb, poultry. Meat must have all visible fat removed; poultry must have skin removed. Fresh and frozen fish, canned tuna, salmon, crab, and lobster (water packed or rinsed and drained), low fat cottage cheese, mozzarella cheese, Parmesan cheese or other low-fat cheeses | Fatty fish, fatty meats, ham, pork, bacon, duck, goose, highly seasoned meats such as bratwurst, lunchmeats, and sausages, frankfurters, corned beef, fried meats or fish, all other cheeses, and peanut butter. |
| Potatoes and Substitutes | Boiled, mashed, baked or escalloped white potatoes, baked or mashed sweet potatoes, noodles, rice, spaghetti, macaroni | Fried potatoes |
| Soups | Clear or skimmed broth, soups with vegetables added. Creamed soups made with skim milk | All others |
| Vegetables | All vegetables fresh, frozen, or canned | None. Some patients may complain of dyspepsia or discomfort after eating vegetables such as cabbage, broccoli, Brussels sprouts, cauliflower, and onions. If so, these as any other foods should be avoided. |
| Fat | One to three teaspoons daily of butter, margarine, oils, and low kilocalorie salad dressing. Gravies made with skim milk or with clear fat-free broths and thickened with cornstarch or flour | Gravy, bacon, sour cream, regular commercial salad dressings, mayonnaise, salad oil |

Table 13-4 (continued)

| Food Types | Foods Allowed | Foods to Avoid |
|---|---|---|
| Fruits | All fruits and juices, frozen, or canned | None except avocados and olives |
| Desserts | Gelatin, angel food and sponge cake, plain cookies, fruit ices, slushes, puddings made with skim milk | Rich pastries, cakes, cookies and desserts made with whole milk, eggs, cream, coconut, and nuts |
| Miscellaneous | Moderate amounts of plain, hard candy, honey syrup and sugar. Foods fried in non-stick vegetable sprays or in non-stick skillets without the addition of fat. May use imitation butter flavoring for cooking | Nuts, chocolate, coconut, black pepper, chili powder, mustard seed, nutmeg. According to patient tolerance, highly seasoned sauces such as Tabasco, Worcestershire, and steak sauces may need to be limited |

**Table 13–5** Sample Menu for Low-Fat Bland Diet

| Breakfast | Morning Snack |
|---|---|
| Orange juice<br>Toast-jelly<br>One teaspoon margarine or butter<br>Poached egg<br>Skim milk | Skim milk<br>Crackers |
| **Lunch** | **Afternoon Snack** |
| Baked chicken (no skin)<br>Green peas<br>Bread<br>One teaspoon margarine or butter<br>Fresh fruit<br>Skim milk | Low-fat pudding<br>(made with skim milk) |
| **Dinner** | **Bedtime Snack** |
| Homemade vegetable soup<br>(without broth base or meat drippings)<br>Roast beef<br>Baked potato with yogurt<br>Carrots<br>Bread<br>One teaspoon margarine or butter<br>Skim milk or fruit juice | Skim milk<br>Vanilla wafers |

## Test Your Knowledge

Test your knowledge of gallbladder disease. The suggested answers to the following 4 questions are at the end of this module.

1. What dairy products would you tell patients who have gallbladder disease to avoid?

2. What meat cooking methods would you suggest to a patient with gallbladder disease?

3. Although fruits overall have a negligible fat content, what two fruits may need to be avoided on a low-fat diet?

4. True or False? Coconut cream pie would be an excellent snack for the patient with gallbladder disease. Defend your answer.

## Reflux Esophagitis and Dietary Management

**Dietary management for the patient with reflux esophagitis should be a low-fat, bland, small frequent-feeding diet, identical to the one used for the gallbladder disease patient, but with the additional restriction in some patients of citrus juices, tomato juice, and some spicy foods.**

Reflux esophagitis, an acute or chronic inflammation of the esophageal wall, occurs when the gastric contents reflux into the lower esophagus. Reflux esophagitis, characterized by substernal pain (heartburn), is caused by a hypotensive, incompetent lower esophageal sphincter.

Often associated with reflux esophagitis is the herniation of a portion of the stomach through the hiatus of the diaphragm. Hiatus hernias may be asymptomatic. When the esophageal sphincter becomes incompetent, reflux of gastric juices into the lower esophagus occurs, causing esophagitis.

The objectives of therapy for reflux esophagitis patients are to protect the esophagus from irritation, to reduce gastric acidity, and to reduce the reflux of gastric content into the esophagus. Antacid preparations are usually prescribed along with dietary management. Instead of giving antacids one hour after a meal as in ulcer patients, it may be better to give antacids when gastric distention occurs in order to buffer the esophagus.

The dietary management for patients with reflux esophagitis consists of a low-fat, bland, small frequent-feeding diet in an attempt to maintain lower esophageal sphincter pressure. This diet, which is low in fat, will usually be high in protein. Protein favorably increases lower esophageal

sphincter pressure and decreases reflux. Coffee, decaffeinated coffee, tea, chocolate, and alcohol should be limited in the diet of patients with reflux esophagitis. In some reflux patients, citrus juices, tomato juice, and other spicy foods may not be well tolerated and should be discouraged. When citrus juices are restricted, the patient should be given an ascorbic acid supplement.

When tested on normal subjects, a high-fat test meal has been shown to significantly decrease esophageal sphincter pressure. Carbohydrate, on the other hand, resulted in a slight increase in lower esophageal sphincter pressure. When whole milk was compared to skim milk, a slight decrease in lower esophageal pressure occurred with the whole milk, and a significant increase in the lower esophageal sphincter pressure occurred with skim milk. Chocolate syrup, regular coffee, decaffeinated coffee, and tea have been shown to effectively lower the lower esophageal sphincter pressure; such an effect may be attributable to the caffeine, theobromine, and theophylline content of these foods. Less significant, but important to some patients, is the fact that spicy foods, citrus fruit juices, and tomato juice also lowered the lower esophageal sphincter pressure and caused frequent secondary esophageal contractions.[1,12]

Six small meals may be better than fewer larger meals in the dietary management treatment of patients with reflux esophagitis. A light evening meal to avoid distention, particularly before retiring, should be advised. The patient should also be advised to remain in an upright position after meals. If the patient is overweight, a weight-reduction diet should be prescribed, because excess abdominal fat is believed to increase gastric reflux. Avoidance of constipation is also recommended.

When instructing patients on the dietary management for reflux esophagitis, use the low-fat bland diet information in Table 13–4 and caution the patient to avoid citrus fruits, tomato juice, and other spicy foods if the patient finds these intolerable. Suggest that the patient consume frequent small feedings, eat lightly at the supper meal, and lose weight if he is overweight. The low-fat bland diet meal pattern in Table 13–5, with the possible exception of orange juice, would be an appropriate sample menu for a patient with reflux esophagitis.

## Lactose Intolerance and Dietary Management

**The treatment for patients with lactose intolerance requires that lactose be restricted to the tolerance level. This may mean total elimination of lactose from the diet, although many persons appear to tolerate physiological amounts of milk (½ to 1 cup per meal) without significant gastrointestinal symptoms, especially if the milk is taken with other foods.**

Deficiency or insufficiency of the jejunal enzyme lactase is the most frequently reported isolated enzyme anomaly. Lactase deficiency in the North American adult population is reported to vary from 16% to 55%. It is most frequently encountered in American blacks, Asians, South Americans, Greek Cypriots, Arabs, Ashkenazic Jews, Africans, Japanese, Thais, Formosans, and Filipinos. The incidence among American blacks is believed to be as high as 70%.

Congenital lactase deficiency is rare, but acquired lactose intolerance is frequently seen in adults and children after age six years. Secondary lactase deficiency can occur as a result of jejunal mucosal villi damage. Gastrointestinal infections in infants frequently render these children lactose intolerant during the infection period and for a period of time after the infection. Lactose intolerance has also been seen in patients with celiac sprue, tropical sprue, ileitis, colitis, cystic fibrosis, and kwashiorkor. Also, severe milk intolerance may be seen secondary to subtotal gastrectomy where a gastrojejunostomy is formed and a decrease in jejunal surface area occurs.

When lactose is consumed by individuals with lactose intolerance, the disaccharide is not hydrolyzed and absorbed but instead remains within the gut lumen where it exerts a hyperosmolar effect. Large volumes of water are drawn into the gut lumen, and distension and discomfort develop. When the sugar passes into the colon and is metabolized by bacteria to lactic acid and other organic acids, further increase in osmolar load occurs along with gas production that results in bloating, cramping, diarrhea, and flatulence.

**Table 13–6** Acceptable and Nonacceptable Foods on a Lactose-Restricted Diet

| Food Group | Acceptable Foods | Foods to Avoid |
|---|---|---|
| Beverages | Coffee, tea, carbonated beverages, whiskey, gin, rum, Scotch, vodka, ale, beer, cordials, liquors, pure cocoa or chocolate | Instant coffee and powdered soft drinks (e.g., Koolaid), cocoa beverages, and Ovaltine because lactose is added frequently in small amounts as an anticaking compound |
| Dairy Products | Soybean milk and other milk-free supplements, lactose-free non-dairy creamer, fermented cheeses, yogurt, buttermilk, cottage cheese (dry curd), sour cream | Milk, malted milk, evaporated or sweetened condensed milk, cocoa powders, curds, whey, milk chocolate, instant chocolate, infant formulas and supplements containing milk or milk products, powdered coffee creamer |
| Vegetables and Fruit Juices | All except those listed to avoid as they contain some added lactose in processing | Canned or frozen vegetables and dietetic fruit if milk or milk products have been added as cream sources |
| Meat and Meat Substitutes | All meats, poultry, fish, and eggs prepared without breading, gravies, or sauces containing no milk or milk products, dried beans and peas, peanut butter and soybeans, yogurt-made gravies and sauces | Processed cheeses (American spreads), canned fish or meat, wiener, sausage, luncheon and breaded meat products if milk or a milk product has been added |
| Starches | Potatoes, spaghetti, noodles, rice, macaroni, dry cereal if no milk added, milk-based bread products if tolerated up to 3 servings per day, water-based bread products such as French or Italian bread and bagels as desired | Instant mashed potatoes and prepared instant cereal if milk is added (Total, Special K, Cocoa Krispies, Fortified Oat Flakes), zwieback, waffles, corn curls, commercial French fried potatoes, commercial sweet rolls, regular bread made with nonfat dry milk |
| Fats | Butter, margarine, salad dressings (if they do not contain milk or milk products), pure mayonnaise, shortening and vegetable oils, bacon, olives, meat gravy without milk | Cream and cream substitutes, mayonnaise containing milk or milk products, milk-based gravies, whipped toppings |

Table 13-6 (continued)

| Food Group | Acceptable Foods | Foods to Avoid |
|---|---|---|
| Desserts and Sweets | Fruit ices made with water (slushes), gelatin, angel food cake, homemade cakes, pies and cookies (if made without milk), pure chocolate or cocoa, sugar, honey, jam, candies made without milk (gumdrops, hard candy, jelly beans, colored mints), marshmallows | Commercial desserts and prepared mixes with milk or milk products, ice cream, sherbet, milk chocolate, puddings, custard, malted milk candies, chocolate cream candy, caramels, fudge |
| Condiments and Seasonings | Salt, pepper, pure spices, herbs | Any spice blend with a milk based filler, monosodium glutamate, citric acid |
| Miscellaneous | Pretzels, potato chips, corn chips, popcorn, nuts, Melba toast | Cheese-flavored chips, commercial party dips, ascorbic acid tablets and other medications with a milk product filler |

Table 13-7 Lactose Content of Selected Milks and Milk Products

| Milks and Milk Products | Lactose per 100 Milliliters (grams) |
|---|---|
| Milk, human | 5 |
| Milk, cow (whole, low-fat, skim) | 5 |
| Buttermilk | 5 |
| Ice cream | 5 |
| Milk-based puddings and custards | 3-5 |
| Milk chocolate | 8 |
| Yogurt | 4-6 |
| Evaporated milk | 10-14 |
| Sweetened condensed milk | 10-14 |
| Skim milk powder | 15.5 gm/30 gm |
| Cottage cheese | 3 gm/30 gm |
| Other cheeses | 5 gm/30 gm |

In severe lactase deficiency, lactose is eliminated from the diet as much as possible. Table 13–6 lists those foods allowed and not allowed on the lactose-restricted diet. In Table 13-7, a list of the lactose content of selected foods is presented. Because lactose is included in small but significant amounts in many foods, particularly bread and starch products, desserts, processed meats, convenience foods, baby foods, and even medications, patients must be told to read labels of all food packages for these ingredients.

Individuals with an insufficient but not total deficiency of lactase can frequently tolerate small amounts of milk as a beverage with meals or some lactose in foods, such as breads made with non-fat dry milk. Many patients with lactase insufficiency can consume cultured or fermented dairy products such as cheese, cottage cheese, yogurt, buttermilk, and sour cream. During the fermentation process, some of the lactose is converted to lactic acid. It may well be that the bacteria used in the fermentation process are still viable when consumed and may continue to exert their lactase activity within the small intestine; this may decrease the characteristic symptoms of lactose intolerance.

If the patient has been diagnosed as having a severe lactose intolerance necessitating a lactose-free diet, the supplementation of calcium and vitamin D will be necessary, especially in those patients who refuse to consume cultured or fermented dairy products. After lactose has been eliminated totally from the patient's diet for a period of time (generally one month), you may want to recommend to the patient that he slowly introduce lactose-containing foods into his diet one at a time. The patient can then determine which foods and how much of each food he can tolerate without symptoms. Including such products in the diet will increase the nutrient content of the diet, the palatability of food, and the enjoyment of eating.

## Test Your Knowledge

Test your knowledge of lactose intolerance. Then check your answers for the following 2 questions with the suggested answers given at the end of this module.

1. What nutrients may have to be supplemented in the diet of lactase-deficient patients when a strict lactose-free diet must be consumed?

2. In order to alleviate the possible low intake of calcium and vitamin D, what milk-containing foods may be included in the lactose-intolerant patient's diet with minimal occurrence of lactose intolerance symptoms?

## Diverticulosis, Diverticulitis, and Dietary Management

**Traditionally, a low-fiber diet was used in the treatment of diverticulosis. Current treatment is a high-fiber diet, which is effective in increasing fecal mass and decreasing intraluminal pressure. During an acute attack of diverticulitis with mucosal bleeding, a fiber-restricted diet is indicated.**

The development of diverticulosis, generally occurring in the sigmoid colon, has been attributed to increased intraluminal pressure in some people. The hypertrophied musculature of the sigmoid wall seems to exhibit motor activity to various stimuli in excess of that seen in normal individuals. This activity of the thickened sigmoid muscle leads to high intracolonic pressures. These high pressures contribute to the formation of diverticuli. Many patients with diverticulosis have no symptoms, while others complain of severe lower abdominal pain and distention, especially if diverticulitis is present.

Because a large fecal mass in the sigmoid prevents the close approximation of the colonic walls, dietary treatment is aimed at increasing fecal mass, decreasing intraluminal pressure and decreasing the accumulation of luminal residue inside the diverticuli. A diet high in fiber is recommended for these purposes. On a high-fiber diet, a large stool forms due to the water-holding capacity of the fiber, and the large luminal mass passes quickly through the bowel. Prior to the current treatment of diverticulosis with a high-fiber diet, the disease was treated by a fiber-restricted diet.

With a low-fiber diet, stool bulk is decreased, the stool becomes hard, and the lumen increases in pressure to move the mass through the colon, leading to muscle hypertrophy. As the pressure continues, the mucosa prolapses between the tenia coli, forming the diverticuli. During an acute attack of diverticulitis with mucosal bleeding, a fiber-restricted diet is indicated.

### What Is Dietary Fiber?

The two terms fiber and roughage are used synonymously. These terms describe the polysaccharide and lignin components of the plant cell wall and the sap component which is responsible for cell structure. Fiber consists of cellulose, hemicellulose, lignin, pectins, and gums which are sugar polymers and are not enzymatically digestible by the human digestive system.

The term crude fiber refers to the fibrous residue left after extraction with a strong acid and base. Crude fiber measures only cellulose and lignin and therefore greatly underestimates total dietary fiber. Published fiber figures are usually crude fiber values. These figures are on the average two to five times less than the actual dietary fiber content.

**Unprocessed wheat bran, unrefined breakfast cereals, and whole wheat and rye flours are the most significant food sources of dietary fiber. Fruits (except bananas), vegetables (except potatoes), nuts, and legumes are also major contributors of dietary fiber.**

Some patients may prefer to find added relief from consuming unprocessed wheat bran to increase their fiber intake. When consuming bran, it is advisable to start with small doses (1 teaspoon a day) and gradually increase (as tolerated by teaspoons) up to 3 to 4 Tablespoons (9 to 12 teaspoons) a day. Six teaspoons a day is generally effective in relieving pain associated with various gastrointestinal diseases treatable with a moderate- to high-fiber diet. Starting with large amounts of bran intake may give rise to considerable abdominal discomfort and flatus. Wheat bran can be purchased and added to milk, cereal, yogurt, and other foodstuffs, or it can be added to flour when cooking.

As mentioned previously, dietary fiber has the ability to absorb water and thus make the contents of the gut bulky and soft. One teaspoon of wheat bran a day may be all that is needed to regularize an indolent bowel. However, a diet high in fiber from fruits, vegetables, and legumes, and without the addition of wheat bran, will also increase fecal size as well as soften the stools.

When helping a patient increase the quantity of fiber in his diet, the following suggestions should be helpful:

- Use unprocessed wheat bran and unrefined breakfast cereals.
- Substitute rye or whole wheat flour for white flour when baking.
- Use whole wheat, rye, or pumpernickel bread whenever one would normally use white bread, such as for toast, bread dressing, French toast, sandwiches, croutons, breading, and others.
- Consume raw or cooked vegetables and salads.
- Consume cooked legumes such as chick-peas, baked beans, lima beans, soybeans.
- Use fresh, dried, and canned fruits or juices such as orange sections or half a grapefruit for breakfast and snacks.
- Use fruits for desserts; if cakes or cookies are consumed, they could be made with whole wheat flour and flavored with nuts, coconut, dates, and other fruits.
- When snacking, include foods such as fruits and vegetables.

In patients with diverticulosis, restriction of nuts, seeds, hulls (such as popcorn), and berries (particularly strawberries, blueberries, raspberries, and blackberries) may be warranted. The rationale for this is that such items may become trapped in the diverticuli and become painful. With a high-fiber diet and fast colon transit, the incidence of trapping of these items in the diverticuli is diminished, and therefore these products are not routinely eliminated from diet of the patient with diverticulosis. Patient tolerance, however, should be the deciding factor.

Appendix B, entitled Fiber Content of Selected Foods, includes a list of high-fiber content foods showing both their crude and dietary fiber contents. Table 13–8 includes a sample menu for one day which is high in dietary fiber and would be a good example of a menu for use in teaching the diverticulosis patient about a high-fiber diet.

## Guidelines for Fiber-Restricted Diets

### Low-Fiber Diet

During an acute attack of diverticulitis with mucosal bleeding, a fiber-restricted diet is indicated. This diet limits the use of foods in Group III and Group IV (Table 13–9) to two to three servings per day. (The patient may be sick enough to warrant no oral intake.)

### Minimal-Fiber Diet

The minimal-fiber diet is appropriate to prepare a patient for bowel surgery and for these patients immediately following surgery. This diet eliminates foods such as whole-grain cereals and breads, nuts, fruits, and vegetables except juices. Foods considered to have a negligible amount of dietary fiber (such as milk, meat, eggs, sugars, and fats) may be used in addition to foods from Group I (Table 13–9). This diet may be inadequate in kilocalories and several nutrients depending upon intake, and if used for any period of time, should be supplemented with a one-a-day mineral and vitamin preparation which meets 100% of the RDA. Commercial low-residue and low-fiber supplements may be needed if this diet is used for an extended period of time in order to provide adequate kilocalories.

Table 13–8 Sample Menu for a High-Fiber Diet

| Breakfast | Lunch | Dinner |
|---|---|---|
| Orange sections | Vegetable Soup | Roast beef |
| Bran cereal | Sliced turkey with lettuce and tomato on whole wheat bread | Baked potato |
| Whole wheat toast | | Peas |
| Margarine | Tossed salad | Fresh vegetable salad |
| Milk | Fresh fruit | Bran muffin |
| | Milk | Margarine |
| | | Milk |

## Table 13–9 Approximate Fiber in Commonly Used Food Portions

| | Breads & Cereals | Fruits | Vegetables | Legumes, Nuts, Seeds | Miscellaneous |
|---|---|---|---|---|---|
| Group I[a]<br><br>Less than 1.5 grams dietary fiber[b] | white flour<br>plain white bread, crackers, etc.<br>pastas<br>white rice<br>Cheerios<br>Rice Krispies<br>Special K<br>plain cooked refined cereals<br>oatmeal | strained clear fruit juices | peppers, cooked | most texturized vegetable protein entrees<br>split peas, cooked | jam<br>jelly<br>marmalade |
| Group II<br><br>1.6–1.99 grams dietary fiber | brown rice<br>most cold cereals[c] | applesauce<br>avocado<br>banana<br>cantaloupe<br>plums, canned | asparagus, cooked<br>cucumber, peeled<br>lettuce<br>tomato, canned | | |
| Group III<br><br>2.9–2.99 grams dietary fiber | | most canned, cooked, and fresh fruits[c] | most canned or cooked vegetables without peelings or seeds[c]<br>cucumber, unpeeled<br>turnips, fresh<br>tomato, fresh | smooth peanut butter<br>cashews | |
| Group IV<br><br>3.0–3.99 grams dietary fiber | whole wheat and rye flour, bread, etc.<br>cereals with dried fruits or nuts<br>granola<br>grapenuts | raisins<br>oranges, fresh<br>figs, fresh<br>dates<br>prunes | white potato with skin<br>beet greens<br>beets<br>green beans<br>sweet potato<br>wax beans<br>pumpkin, canned | kidney beans | popcorn |
| Group V<br><br>4.0–5.99 grams dietary fiber | shredded wheat | raspberries, fresh and canned | broccoli<br>corn<br>parsnips<br>green peas<br>artichoke<br>winter squash | lima beans<br>lentils<br>soybeans<br>most nuts[c]<br>chick peas<br>baked beans<br>filberts<br>sunflower seeds | |
| Group VI<br><br>Greater than 6.0 grams dietary fiber | bran, bran cereals, bran muffins, etc. | pear, fresh<br>figs, dried<br>persimmon, fresh<br>currants, dried<br>apples, fresh<br>blackberries | | | |

[a]Foods which are generally not restricted for Minimal Residue Diets, but for which actual figures for dietary fiber or residue were unobtainable are cereal beverages, coffee, tea, bouillon broth, margarine, butter, vegetable oil, shortening, whipped cream, eggs, tender meats, poultry, fish, strained vegetable juices, seasonings.

[b]Dietary Fiber Based on value for dietary fiber when available, or estimated from crude fiber as follows.
dietary fiber = 5 × crude fiber for breads, cereals, and grains
dietary fiber = 3.5 × crude fiber for legumes, nuts, seeds, and vegetables
dietary fiber = 4 × crude fiber for fruits

Dietary fiber includes all the indigestible substances in food, crude fiber is the residue remaining after treatment with boiling sulfuric acid, sodium hydroxide, water, alcohol, and ether While some sources state that crude fiber is approximately 50% of dietary fiber, comparison of foods for which both figures are available yielded the above estimates of 20-30%

[c]Unless specified elsewhere.

Used by permission from *Diet Manual — Utilizing a Vegetarian Diet Plan*, 5th edition, Seventh Day Adventist Dietetic Association, Washington, D C., 1978 (pp 70-75)

## Crohn's Disease (Regional Enteritis) and Dietary Management

**Dietary management for the patient with Crohn's disease should include foods that are nutritionally balanced, high in protein and kilocalories, and easily tolerated. Six small feedings per day, use of medium chain triglycerides, administration of a multivitamin and mineral preparation, and a diet low in fat and high in dairy products may be indicated.**

Crohn's disease is a chronic progressive disease most commonly affecting the ileum and jejunum. When hyperplasia of the lymphatics occurs, interference with the blood supply to the gut mucosa occurs, resulting in edema, ulceration, mucosal scarring, narrowing of the bowel lumen, and obstruction.

Persistent diarrhea and steatorrhea are common symptoms of Crohn's disease. If the disease is extensive, there will be poor absorption of all nutrients and marked malnutrition. The patient at this severe stage should be hospitalized, at which time he will need to be seen by a clinical dietitian to determine his nutritional status and mode of nutritional therapy. Marked undernutrition, protein depletion, and iron and vitamin $B_{12}$-deficiency anemias are common.

For the patient with Crohn's disease who is not in acute distress, the diet recommended is a regular diet as tolerated, for some patients, a bland, low-fiber diet may be preferred. The diet should be nutritionally balanced, high in protein and kilocalories, and easily tolerated. Six small feedings a day may be better tolerated than three larger meals.

Use of medium chain triglycerides, which are less dependent on bile salts for absorption, may be well tolerated by patients with steatorrhea who require a high-kilocalorie intake; high-kilocalorie supplements may also be required in the malabsorbing patient. A one-a-day vitamin and mineral supplement meeting 100% of the RDA should be given; vitamin K, vitamin $B_{12}$, and iron may need to be given parenterally when they are not sufficiently absorbed from the diseased intestinal tract. Be sure to check for lactose intolerance in patients with Crohn's disease.

## Ulcerative Colitis and Dietary Management

**Dietary management for the patient with ulcerative colitis is supportive rather than curative. The diet is usually high in protein and kilocalories (and may be high in medium chain triglycerides) and low in fiber and fat. It generally consists of small feedings and may need to be low in lactose and oxalate and high in dairy products if renal stones develop.**

Ulcerative colitis, an inflammatory disease of the colon, has no known etiology for the friable and hyperemic state of the mucosa. Malnutrition and anemia may occur when the patient experiences frequent, semiliquid stools and blood loss.

In ulcerative colitis, the role of any special dietary regimen has not been established — the diet appears to be supportive rather than curative. In the acute phase of a severe attack, oral feeding may be suspended, or a minimum- or low-fiber diet may be necessary. Because many ulcerative colitis patients are malnourished, a high-protein, high-kilocalorie, and low-fiber and residue diet is generally prescribed. The diet should be designed to stimulate the appetite. Six small feedings per day are tolerated better and are more preferred by the patient than are fewer, larger-sized meals.

When patients have steatorrhea, restriction of dietary fat may be required to decrease the loss of minerals such as calcium and fatty acid-calcium complex soaps. Increased calcium malabsorption results in increased oxalate absorption and potential renal stone formation. Diets high in skim milk, dairy products, and calcium and low in oxalate will help decrease the incidence of oxalate renal stones. Use of medium chain triglycerides will also be helpful for the ulcerative colitis patient who has steatorrhea and needs a high kilocalorie intake.

Unreasonable restriction of the diet can impose needless psychological burden on the patient, therefore the patient with ulcerative colitis should be encouraged to eat whatever he desires. Sometimes, an understanding and encouraging health

p.ofessional can help to stimulate a patient's appetite. Vitamin and mineral supplements and iron supplementation should always be part of the ulcerative colitis patient's dietary prescription.

## Irritable Bowel Syndrome or Spastic Colon and Dietary Management

In the irritable bowel syndrome, the problem may be the overreactive musculature of the bowel due to the presence of food in the stomach or bowel, or the problem may be due to psychological stress. Antispasmodic medications are useful as is a high-fiber diet. Refer to the section on diverticulosis to explain the high-fiber diet to the patient. An encouraging and understanding health professional can be of great help to the patient with irritable bowel syndrome

## Summary

Although much controversy still exists concerning the role of diet in the treatment of gastrointestinal disturbances, modified diets are commonly prescribed and produce favorable results. These diets do have physiological bases, yet it is believed that the psychological component of many diseases may negate the favorable role of diet; therefore, the diet should be individualized to the patient.

A supportive and encouraging health professional, be the person a physician, clinical dietitian, or nurse, can be of great assistance to patients with gastrointestinal diseases in helping them to eat a diet which is adequate in kilocalories and other nutrients, yet individualized to their own food idiosyncrasies.

## Test Your Knowledge

Test your knowledge of fiber, diverticulosis, Crohn's disease, and ulcerative colitis. The suggested answers to the following 4 questions are at the end of this module.

1. Why should the diet for patients with diverticulosis be high in dietary fiber?

2. Distinguish between the terms dietary fiber and crude fiber.

3. What diet would be appropriate for you to prescribe for a patient with an acute attack of diverticulitis with mucosal bleeding?

4. When steatorrhea occurs in patients with Crohn's disease or ulcerative colitis, name two negative side effects which you will want to correct by ordering a low-fat diet.

## Answers

### Peptic Ulcer Disease

1. a. Omit known gastric acid stimulants.
   Caffeine
   Theobromine
   Theophylline
   Alcohol
   Meat extracts
   Certain spices:
   black pepper
   chili powder
   mustard seed
   nutmeg

   b. Provide frequent small feedings during the acute stage. Evening snacks may or may not be restricted.

   c. Individualize the diet as the patient requests, but make certain that it supports a well-balanced nutrient intake. Protein intake should be at least 0.8 gm per kilogram body weight, fat intake should be moderate, and carbohydrate intake should provide necessary kilocalories. Roughage and low-pH foods should be restricted only if the patient experiences pain when eating them.

2. See sample menu in Table 13–3.

### Gallbladder Disease

1. Whole milk
   Lowfat (2%) milk
   Buttermilk made with whole milk
   Any cheeses except those made with skim milk
   Cream

2. Bake
   Broil
   Roast
   Stew

3. Avocados
   Olives

4. False. Coconut, the cream filling, and the pastry shell each contain a large amount of fat. The meringue topping, however, would be acceptable since it is made with fat-free egg whites and sugar.

### Lactose Intolerance

1. Calcium
   Vitamin D
   Also possibly phosphorus and riboflavin

2. Fermented dairy products including cheeses, yogurt, buttermilk, and sour cream.

**Fiber, Diverticulosis, Crohn's Disease, and Ulcerative Colitis**

1. A diet high in fiber forms a large, soft stool due to the water-holding capacity of fiber. A large, fast-transit stool causes an increase in intracolonic size and a decrease in intracolonic pressure thereby decreasing the symptoms of diverticulosis.
2. *Dietary fiber* is that group of compounds in foods which contributes to the fecal mass because the human gut has no enzymes capable of digesting fiber. *Crude fiber* is the fibrous residue (primarily cellulose and lignin) which is left after extraction with strong acid and strong base. Its value is two to five times less than true dietary fiber.
3. A low-fiber diet.
4. Steatorrhea causes (1) loss of kilocalories with malabsorption resulting in weight loss and malnutrition, and (2) fatty acid-calcium soap excretion and increased oxalate absorption which increases the patient's risk of developing renal stones.

## References


1. Babko, J.C. and Costere, D.G.: "The Effects of Specific Foods on the Lower Esophageal Sphincter." *American Journal of Digestive Diseases*, 18:391, 1973.
2. Cohen, S.: "Recent Advances in Management of Gastrointestinal Reflux." *Postgraduate Medicine*, 57:97, 1975.
3. Cohen, S.: "Coffee Drinking and Peptic Ulcer Disease." *Nutrition Reviews*, 34:167, 1976.
4. Cohen, S. and Booth, G.H.: "Gastric Acid Secretion and Lower Esophageal-Sphincter Pressure in Response to Coffee and Caffeine." *New England Journal of Medicine*, 293(18):897, 1975.
5. Coyne, M.J. and Schoenfield, L.J.: "Gallstone Disease." *Postgraduate Medicine*, 57:153, 1975.
6. Donaldson, R.M., Jr.: "The Muddle of Diets for Gastrointestinal Disorders." *Journal of the American Medical Association*, 225:1243, 1973.
7. Friedman, G.D., et al.: "Cigarettes, Alcohol, Coffee, and Peptic Ulcer." *New England Journal of Medicine*, 290:469, 1974.
8. Goodhard, R.S., Shils, M.F.. *Modern Nutrition in Health and Disease*. 5th ed. Philadelphia, Lea & Febiger, 1973.
9. Isenberg, J.I.: "Peptic Ulcer Disease." *Postgraduate Medicine*, 57:163, 1975.
10. Kirwan, W.O.: "Action of Different Bran Preparations on Colonic Function." *British Medical Journal*, 4:187, 1974.
11. Mitchell, H.S., Rynbergen, H.J., Anderson, L., and Dibble, M.V.: *Nutrition in Health and Disease*. 16th ed. Philadelphia, Lippincott, 1976.
12. Nebel, O.T. and Coshel, D.B.: "Lower Esophageal Sphincter Pressure Change After Food Ingestion." *Gastroenterology*, 63:778, 1972.
13. Plumley, P.F. and Francis, B.. "Dietary Management of Diverticular Disease." *Journal of the American Dietetic Association*, 63:527, 1973.
14. Ransome-Kuti, O.: "Lactose Intolerance — A Review." *Postgraduate Medicine*, 53 Supplement 2:73, 1977.
15. Scola, J.: "Fiber — The Forgotten Nutrient." *Food Technology*, 28:34, 1974.
16. Spiro, H.M.: *Clinical Gastroenterology*. New York, Macmillan, 1977.
17. Schneider, H.A. et al.: *Nutritional Support of Medical Practice*. Hagerstown, MD, Harper & Row, 1977.
18. Wagner, S.M., Mekhjian, H.S., Caldwell, J.H. and Thomas, F.B.: "Effects of Caffeine and Coffee on Fluid Transportation in the Small Intestine." *Gastroenterology*, 75:379, 1978.


## Resources for the Physician and the Patient

Lappé, F.M.: *Diet for a Small Planet*. New York, Ballantine, 1975.

Lappé, F.M. and Ewald, E.B.: *Great Meatless Meals*. New York, Ballantine, 1976.

Longarre, D.J.: *More with Less Cookbook*. Scottsdale, PA: Harold Press, 1976

## Appendix A

**Table 13–10** Caffeine and Theobromine Content of Selected Foods*

| Food | Caffeine (milligrams per ounce) | Theobromine (milligrams per ounce) |
|---|---|---|
| **Carbonated Beverages** | | |
| Mr. Pibb | 4.5 | |
| Diet Mr. Pibb | 4.5 | |
| Mountain Dew | 4.11 | |
| Tab | 3.8 | |
| Shasta Cola | 3.7 | |
| Shasta Diet Cola | 3.7 | |
| Coca Cola | 3.5 | |
| Pepsi Cola | 2.92 | |
| Diet Pepsi | 2.86 | |
| Pepsi Light | 2.78 | |
| Royal Crown Cola | 2.25 | |
| Sugar Free Diet Rite Cola | 2.25 | |
| **Cocoa and Chocolate** | | |
| Carnation Company | | |
| Chocolate Malted Milk | 10.79 | 63.92 |
| Cocoa Supreme Hot Cocoa Mix | 15.90 | 49.17 |
| Instant Breakfast | | |
| Chocolate | 15.05 | 91.19 |
| Chocolate Malt | 12.50 | 75.00 |
| Milk Chocolate Hot Cocoa Mix | 11.93 | 46.87 |
| Rich Chocolate Hot Cocoa Mix | 13.06 | 49.14 |
| Slender | | |
| Chocolate Powdered | 4.54 | 73.01 |
| Chocolate Malt Powdered | 7.67 | 45.73 |
| Dutch Chocolate Powdered | 18.46 | 111.07 |
| Hershey Company | | |
| Baking Chocolate | 25.00 | 390.00 |
| Cocoa | 75.00 | 415.00 |
| Hot Cocoa Mix | 5.00 | 60.00 |
| Instant Cocoa | 10.00 | 95.00 |
| Milk Chocolate | 5.00 | 55.00 |
| Special Dark Chocolate | 20.00 | 120.00 |

Table 13-10 (continued)

| Food | Caffeine (milligrams per ounce) |
|---|---|
| Coffee | |
| Brim (General Foods) | |
| 100% Freeze-dried | 9.2 |
| Sanka (General Foods) | |
| 97% Caffeine-Free | |
| Regular/Drip grind | 0.84 |
| Instant | 0.33 |
| Freeze-dried | 0.33 |
| Maxwell House (General Foods) | |
| Electric-perk | 16.2 |
| Instant | 9.5 |
| Mellow Roast (General Foods) | |
| Brewed | 29.1 |
| Instant | 8.3 |
| Postum (General Foods) | |
| Coffee Substitute | None |
| Tea | |
| Black, bag, brewed 1 minute | 6.0 |
| Black, bag, brewed 5 minutes | 9.0 |
| Black, loose, brewed 5 minutes | 8.0 |
| Oolong, brewed 1 minute | 3.0 |
| Oolong, brewed 5 minutes | 8.0 |
| Instant iced tea, 12 ounces | 1.5-6.0 |

Activity

[a]Caffeine: Most potent central nervous system stimulant, respiratory stimulant. (Source: coffee, tea, chocolate, cocoa)

[b]Theobromine: Potent skeletal muscle stimulant. (Source: chocolate, cocoa)

[a]Nutrient analysis data supplied by the company.
[b]*Textbook of Organic Medicinal and Pharmaceutical Chemistry*, 6th Edition, 1971. J.B. Lippincott Company.

# Appendix B

Table 13–11 Fiber Content of Selected Foods

| Food | Portion Size Commonly Used | Crude Fiber | | Dietary Fiber | |
|---|---|---|---|---|---|
| | | gram per 100 gram | gram per Portion | gram per 100 gram | gram per Portion |
| **Breads and Baked Goods** | | | | | |
| White bread | 2 slices (46 gm) | 0.20 | 0.1 | 2.72 | 1.2 |
| Whole wheat bread | 2 slices (46 gm) | 1.60 | 0.7 | 8.50 | 4.0 |
| Bran muffin | 2 muffins (80 gm) | | 1.4 | | 7.0* |
| White enriched muffin | 2 muffins (80 gm) | | 0.08 | | 0.4* |
| Whole wheat muffin | 2 muffins (80 gm) | | 1.2 | | 6.0* |
| Pancake, buckwheat | 2 4-inch diameter | | 0.4 | | 2.0* |
| Doughnut, cake | 1 (32 gm) | | 0.03 | | 0.2* |
| Doughnut, yeast plain | 1 (32 gm) | | 0.1 | | 0.4* |
| Danish pastry, no nuts | 1 (35 gm) | | 0.1 | | 0.5* |
| **Crackers** | | | | | |
| Ry-Krisp | 6 (38 gm) | 2.20 | 0.8 | | 4.0* |
| **Flours** | | | | | |
| White (70%) | 4 Tbsp (32 gm) | 0.30 | 0.1 | 3.15 | 1.0 |
| Whole wheat | 4 Tbsp (33 gm) | 2.30 | 0.8 | 9.51 | 3.2 |
| Bran | 4 Tbsp (20 gm) | 0.10 | 1.8 | 44.00 | 8.8 |
| **Cereals** | | | | | |
| All Bran | 1/2 cup (28 gm) | 8.21 | 2.3 | 26.70 | 7.5 |
| Corn Flakes | 3/4 cup (19 gm) | 0.80 | 0.2 | 11.00 | 2.0 |
| Grapenuts | 1/2 cup (56 gm) | | | 7.00 | 4.0 |
| Puffed Wheat | 1 cup (12 gm) | 2.00 | 0.2 | 15.41 | 1.8 |
| Rice Krispies | 1 cup (28 gm) | 0.60 | 0.2 | 4.47 | 1.3 |
| Shredded Wheat | 4 large biscuits (22 gm) | 2.30 | 1.0 | 12.26 | 3.4 |
| Special K | 1 1/2 cup (24 gm) | 1.07 | 0.3 | 5.45 | 1.3 |
| Sugar Puffs | 1 cup (30 gm) | 0.40 | 0.1 | 6.08 | 1.8 |
| Raisin Bran | 3/4 cup (26 gm) | | 0.7 | | 3.5* |
| Granola, homemade | 1/3-1/2 cup (40 gm) | | 0.8 | | 4.0* |
| Farina, cooked | 1/2 cup (120 gm) | | 0.1 | | 0.5* |
| Cornmeal, cooked | 1/2 cup (120 gm) | | 0.2 | | 0.5* |
| Oatmeal, cooked | 1/2 cup (120 gm) | | 0.3 | | 1.5* |
| Cheerios | 1/2 cup (25 gm) | | 0.3 | | 1.5* |

Table 13-11 (continued)

| Food | Portion Size Commonly Used | Crude Fiber | | Dietary Fiber | |
|---|---|---|---|---|---|
| | | gram per 100 gram | gram per Portion | gram per 100 gram | gram per Portion |
| **Rice and Pastas** | | | | | |
| White rice | 1 cup (150 gm) | | 0.2 | | 1.0* |
| Brown rice, cooked | 1 cup (150 gm | | 0.4 | | 2.0* |
| Spaghetti, cooked | 1 cup (146 gm) | | 0.1 | | 0.5* |
| **Vegetables** | | | | | |
| Artichoke, cooked, EP | 1 (100 gm) | 2.4 | 2.4 | | 8.4* |
| Asparagus, boiled | 1/2 cup (75 gm) | 0.7 | 0.5 | | 1.8* |
| Beans, green or raw | 1/2 cup (110 gm) | 1.0 | 1.1 | | 3.9* |
| Beets, diced, cooked | 1/2 cup (83 gm.) | 0.8 | 0.7 | | 2.5* |
| Beets, greens, cooked | 1/2 cup (100 gm) | 1.1 | 1.1 | | 3.9* |
| Broccoli tops, boiled | 1 stalk (2/3 cup, 100 gm) | 1.5 | 1.5 | 4.10 | 4.10 |
| Brussels sprouts, boiled | 3/4 cup (113 gm) | | | 2.86 | 3.12 |
| Cabbage, boiled | 1/2 cup (83 gm) | 0.8 | 0.7 | 2.83 | 2.3 |
| Carrots, boiled | 1/2 cup (67 gm) | 1.0 | 0.7 | 3.70 | 2.5 |
| Cauliflower, boiled | 1 cup (114 gm) | 1.0 | 1.2 | 1.80 | 2.0 |
| Celery, boiled | 4 stalks, 5 inch (80 gm) | 0.6 | 0.8 | | 2.8* |
| Corn, sweet, kernels only, canned | 1/2 cup (83 gm) 3/4 medium (75 gm) | 0.5 | 0.4 | 5.69 | 4.7 |
| Cucumber, peeled | 2 cup (110 gm) | 0.6 | 0.5 | | 1.8* |
| Lettuce, raw, chopped | 1/2 cup (100 gm) | 0.5 | 0.6 | 1.53 | 1.6 |
| Mushroom, canned | 1/2 large (100 gm) | 0.6 | 0.6 | | 2.1* |
| Parsnips, raw | 1/2 cup (67 gm) | 2.0 | 2.0 | 4.9 | 4.9 |
| Peas, green, frozen | 1/2 cup (67 gm) | 1.9 | 1.3 | 7.75 | 5.2 |
| Peas, green, canned | 1/2 shell (50 gm) | 2.2 | 1.5 | 7.8 | 5.3 |
| Peppers, cooked | 1 2 1/4 inch diameter (100 gm) | 1.4 | 0.7 | 0.93 | 0.5 |
| Potato, white, raw | | 0.5 | 0.5 | 3.51 | 3.1 |
| Potato, white, canned | 1/2 cup (125 gm) | 0.2 | 0.2 | 2.51 | 3.1 |
| Potato, sweet, baked | 1 small (100 gm) | 0.9 | 0.9 | | 3.2* |
| Potato, french fried | 20 pieces (100 gm) | 1.0 | 1.0 | 3.2 | 3.2 |
| Popcorn | 3 1/2 cup | | 0.7 | | 2.5* |
| Squash, summer, cooked | 1/2 cup (100 gm) | 0.6 | 0.6 | | 2.1* |
| Squash, winter, baked | 1/2 cup (100 gm) | 1.8 | 1.8 | | 6.3* |
| Tomatoes, fresh | 2 small (200 gm) | 0.4 | 0.8 | 1.40 | 2.8 |
| Tomatoes, canned | 1 cup (200 gm) | 0.4 | 0 8 | 0.85 | 1.8 |
| Turnips, raw | 3/4 cup (100 gm) | 0.9 | 0.9 | 2.20 | 2.2 |
| Pumpkin, canned | 1/2 cup (115 gm) | 1.3 | 1.5 | | 5.4* |

Table 13-11 (continued)

| Food | Portion Size Commonly Used | Crude Fiber | | Dietary Fiber | |
|---|---|---|---|---|---|
| | | gram per 100 gram | gram per Portion | gram per 100 gram | gram per Portion |
| **Legumes** | | | | | |
| Beans, baked | 1/2 cup (150 gm) | 1.4 | 2.1 | 7.27 | 10.9 |
| Beans, red kidney | 1/2 cup (60 gm) | 1.5 | 0.9 | | 3.2* |
| Beans, lima, cooked | 1/2 cup (80 gm) | 1.8 | 1.4 | | 4.9* |
| Peas, split, cooked | 1/2 cup (100 gm) | 0.4 | 0.4 | | 1.4* |
| Chick peas | 1/2 cup (100 gm) | 1.8 | 1.8 | | 6.3* |
| Lentils | 1/2 cup (100 gm) | 1.2 | 1.2 | | 4.2* |
| Soybeans | 1/2 cup (100 gm) | 1.6 | 1.6 | | 5.6* |
| **Nuts and Seeds** | | | | | |
| Brazil | 16 medium (60 gm) | 2.0 | 1.2 | 7.73 | 4.6 |
| Cashews | 24-32 each (60 gm) | 1.4 | 0.8 | | 2.8* |
| Filberts | 40-48 each (60 gm) | 15.4 | 0.2 | | 46.0 |
| Pecans, halves | 48 medium (60 gm) | 2.2 | 1.3 | | 4.6* |
| Peanuts | 4 Tbsp (60 gm) | 3.4 | 2.0 | 9.3 | 5.6 |
| Pistachio | 120 each (60 gm) | 2.0 | 1.2 | | 4.2* |
| Sunflower seeds | 2 ounces (60 gm) | 3.8 | 2.3 | | 8.1* |
| Walnuts, halves | 32-60 medium (60 gm) | 2.0 | 1.2 | | 4.2* |
| Peanut butter, smooth | 2 Tbsp (33 gm) | 1.9 | 0.6 | | 2.1* |
| **Fruits** | | | | | |
| Apple, fresh & skin | 1 large (230 gm) | 0.5 | 1.2 | 5.13 | 11.8 |
| Apple juice | 4 ounces (123 gm) | 0.1 | 0.1 | | 0.4* |
| Applesauce | 1/2 cup (100 g ) | 0.5 | 0.5 | | 2.0* |
| Avocado, pitted | 1/8 of 3 1/4x4 (25 gm) | 1.6 | 0.4 | | 1.6* |
| Banana, small | 1 each, 6 inch (100 gm) | 0.5 | 0.5 | 1.75 | 1.75 |
| Cantaloupe | 1/3 of 5 inch (133 gm) | 0.3 | 0.4 | | 1.6* |
| Cherries, red sour | 1/2 cup (100 gm) | 0.4 | 0.4 | 1.24 | 1.24 |
| Cherries, canned | 1/2 cup (100 gm) | 0.1 | 0.1 | | 0.4* |
| Currants, red or white | 1/4 cup (66 gm) | 3.4 | 2.2 | | 8.8* |
| Dates | 4 (40 gm) | 2.3 | 0.9 | | 3.6* |
| Figs, fresh | 2 small (66 gm) | 1.2 | 0.8 | | 3.2* |
| Figs, canned | 2 medium (66 gm) | 0.7 | 0.5 | | 2.0* |
| Figs, dried | 2 small (30 gm) | 4.9 | 1.6 | | 6.4* |
| Grapes, American type | 16 medium (75 gm) | 0.6 | 0.5 | | 2.0* |
| Grape juice | 4 ounces (125 gm) | 0.03 | 0.04 | | 0.4* |
| Grapefruit, canned | 1/2 cup (100 gm) | 0.4 | 0.4 | 0.44 | 0.44 |
| Grapefruit juice | 4 ounces (125 gm) | 0.03 | 0.04 | | 0.4* |

Table 13-11 (continued)

| Food | Portion Size Commonly Used | Crude Fiber | | Dietary Fiber | |
|---|---|---|---|---|---|
| | | gram per 100 gram | gram per Portion | gram per 100 gram | gram per Portion |
| Fruits (continued) | | | | | |
| Honeydew melon | 1/4 of 5 inch (100 gm) | 0.6 | 0.6 | | 2.4* |
| Nectarine, raw | 2 large (150 gm) | 0.4 | 0.6 | | 2.4* |
| Orange, EP | 1 medium (150 gm) | 0.5 | 0.8 | | 3.2* |
| Orange juice | 4 ounces (123 gm) | 0.1 | 0.1 | | 0.4* |
| Peach, raw | 1 large (150 gm) | 0.6 | 0.9 | 2.28 | 3.4 |
| Pear, flesh & skin | 1 whole (150 gm) | 1.4 | 2.1 | 11.03 | 16.5 |
| Persimmon | 1 medium (100 gm) | 1.6 | 1.6 | | 6.4* |
| Pineapple, canned | 3 medium slices(199 gm) | 0.3 | 0.6 | | 3.0 |
| Pineapple, fresh | 1 cup (133 gm) | 0.4 | 0.5 | | 2.0* |
| Plums, canned | 3 medium (150 gm) | 0.3 | 0.5 | | 2.0* |
| Plums, fresh | 3 medium (150 gm) | 0.4 | 0.6 | 1.52 | 2.3 |
| Prune, dried | 6 large (60 gm) | 1.6 | 0.9 | | 3.6* |
| Raisins, dried, seedless | 8 Tbsp (80 gm) | 0.9 | 0.8 | | 3.2* |
| Raspberries, red, raw | 1/3 cup (44 gm) | 3.0 | 1.3 | | 5.2* |
| Raspberries, canned | 1/4 cup (50 gm) | 2.6 | 1.3 | | 5.2* |
| Blackberries, raw | 1/3 cup (48 gm) | 4.1 | 2.0 | | 8.0* |
| Rhubarb, cooked | 1/2 cup (133 gm) | 0.7 | 0.9 | 1.78 | 2.4 |
| Strawberries, lg, raw | 10 each (100 gm) | 1.3 | 1.3 | 2.12 | 2.1 |
| Strawberries, canned | 1 cup (267 gm) | 0.6 | 1.6 | 1.00 | 2.7 |
| Watermelon balls | 3/4 cup (150 gm) | 0.3 | 0.5 | | 1.8* |
| Miscellaneous | | | | | |
| Jam, plum or strawberry | 1 level Tbsp (20 gm) | 1.0 | 0.2 | 1.04 | 0.2 |
| Marmalade | 1 level Tbsp (20 gm) | 1.0 | 0.2 | 0.17 | 0.03 |
| Pickle | 1 large dill (100 gm) | 0.5 | 0.5 | 1.53 | 1.53 |

*Estimated from crude fiber as described for "Approximate Fiber in Commonly Used Foods Portions."
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## Some Abbrevations Used in the Nutrition in Primary Care Series

| | |
|---|---|
| ATP | adenosine triphosphate |
| c | cup |
| cc | cubic centimeter |
| CNS | central nervous system |
| FDA | Food and Drug Administration |
| gm | gram |
| IBW | ideal body weight |
| IU | International Units |
| kcal | kilocalorie |
| kg | kilogram |
| lb | pound |
| lg | large |
| MCV | mean corpuscular volume |
| MDR | minimum daily requirement |
| med | medium |
| mEq | milliequivalent |
| mg | milligram |
| MJ | megajoule |
| ml | milliliter |
| oz | ounce |
| RDA | Recommended Dietary Allowances |
| RE | retinol equivalents |
| sl | slice |
| sm | small |
| Tbsp | Tablespoon |
| TPN | total parenteral nutrition |
| tsp | teaspoon |
| USDA | United States Department of Agriculture |