

EDUCATIONAL OBJECTIVES

After completing the continuing education activity, pharmacists and pharmacy technicians will be able to

- Describe the prevalence of fad diets in society
- Outline the components of different types of fad diets
- Explain the effect different fad diets can have on the body
- Recognize situations in which fad diets present safety concerns for patients



The University of Connecticut School of Pharmacy is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

Pharmacists and pharmacy technicians are eligible to participate in this application-based activity and will receive up to 0.2 CEU (2 contact hours) for completing the activity, passing the post-test with a grade of 70% or better, and completing an online evaluation. Statements of credit are available via the CPE Monitor online system and your participation will be recorded with CPE Monitor within 72 hours of submission

ACPE UAN: 0009-0000-23-022-H05-P
0009-0000-23-022-H05-T

Grant funding: None
Cost: Pharmacists \$7
Technicians: \$4

INITIAL RELEASE DATE: July 15, 2023
EXPIRATION DATE: July 15, 2026

To obtain CPE credit, visit the UConn Online CE Center <https://pharmacyce.uconn.edu/login.php>. Use your NABP E-profile ID and the session code 23YC22-XPk68 for pharmacists or 23YC22-KPX83 for pharmacy technicians to access the online quiz and evaluation. First-time users must pre-register in the Online CE Center. Test results will be displayed immediately and your participation will be recorded with CPE Monitor within 72 hours of completing the requirements.

For questions concerning the online CPE activities, email joanne.nault@uconn.edu.

TO REGISTER and PAY FOR THIS CE, go to:
https://pharmacyce.uconn.edu/program_register.php

You Asked for It! CE



©Can Stock Photo/ixepop

PATIENT SAFETY: Fad Diets: Do They Deserve the Hype?

TARGET AUDIENCE: Pharmacists and pharmacy technicians interested in diet's repercussion on health and potential interactions with disease and medication.

ABSTRACT: In the United States, being overweight or having obesity are two leading causes of health issues, and these rates have increased in recent years. Enter the concept of fad diets. People often turn to diets or tools advertised as promoting quick weight loss without considering the diet's sustainability and their bodies' reaction. Fad diets' one-size-fits-all approach is usually not the cure-all solution people hope it will be. Overall healthy nutrition and lifestyle choices are more beneficial. Due to fad diets' popularity, it is essential to understand their components and their effect within the body to reduce health risks. This continuing education activity discusses intermittent fasting, ketogenic ("keto") diets, pay-for-food systems, paleolithic ("paleo") diets, and the Atkins diet. It identifies patients for whom fad dieting can be dangerous.

FACULTY: Abigail R. Johnson, B.S. is a Regulatory Affairs Coordinator at ARCIEL, LLC and a recent graduate of the UConn Medical Writing Certificate Program.

FACULTY DISCLOSURE: Ms. Johnson has no financial relationships with an ineligible company.

DISCLOSURE OF DISCUSSIONS of OFF-LABEL and INVESTIGATIONAL DRUG USE: This activity may contain discussion of off label/unapproved use of drugs. The content and views presented in this educational program are those of the faculty and do not necessarily represent those of the University of Connecticut School of Pharmacy. Please refer to the official prescribing information for each product for discussion of approved indications, contraindications, and warnings.

INTRODUCTION

Fad diets have always existed but have been on the rise in recent years due to the explosion of social media in the 21st Century. A fad diet is a popular diet followed to achieve fast results or fix long-term problems associated with eating, specifically weight.¹ Fad diets are labeled as fads for a reason. These short-lived trends with wide popularity disregard the rationale behind or quality of the approach itself.^{3,4}

People who choose fad diets are often trying to fix ongoing problems including overweight or obesity, inadequate nutrition, sedentary behaviors, and failure to maintain overall healthy habits.² Individuals who follow fad diets adhere to a mainstream concept of dieting without acknowledging individual health needs and restrictions. Health consequences may arise as a result of adhering to a diet ill-suited to an individual's nutritional needs and ability to sustain the associated effort. In addition, certain diets may influence medication interactions and disease outcomes. For this reason, fad diets can undermine patient safety.

This continuing education activity summarizes popular fad diets to inform pharmacy teams of their benefits and risks. It will allow teams to make recommendations for patients, understand how medications interact with the diets, and help prevent health complications.

The History of Fad Diets

Fad diets have existed throughout history in different forms. For example, in the 1920s, the Cigarette Diet was popular. Lucky Strike, a cigarette company, promoted the Cigarette Diet. They claimed that cigarettes would suppress appetite to boost sales using the tagline “Reach for a Lucky instead of a sweet.” Promoters advertised that people would lose weight successfully while following the diet.⁶ The 1940s saw the rise of the Master Cleanse. This juice cleanse consisted of a meal replacement drink consisting of hot water, lemon juice, maple syrup, and cayenne pepper. Its popularity stemmed from promises of cleansing the body of toxins while providing very few calories. It reached new levels of popularity in 2006, when superstar Beyoncé claimed to lose 20 pounds in two weeks using this method.⁶ In the 1960s, The Drinking Man’s Diet made an appearance. The recommendation was to consume high-protein and low-carbohydrate foods while drinking as much alcohol as desired. An example meal may have included a large serving of steak, salad or vegetables, and several alcoholic beverages. The Drinking Man’s Diet’s supporters considered alcohol a good carbohydrate and allowed indulgence. This diet was marketed toward the male population.⁶

People have always been interested in quick fixes for weight loss and appearance without considering how they will feel or how to keep the weight off indefinitely.¹ This approach to choosing a diet or making nutrition decisions ignores tactics that sustain weight loss. Fad diets are inherently unsustainable options that often lead to weight regain. These outcomes prove many fad diets are unreliable (if not dangerous).

With the creation and explosion of modern social media in the early 2000s, fad diets surged in popularity. Social media often fosters a community of misinformation regarding fad diet composition, how to follow the specific diet, and the diet’s benefits.⁵ Much of the information on social media regarding fad diets lacks reputable, verifiable sources. Fad diet promoters use scientific jargon loosely and inappropriately to make information con-

Table 1. Obesity Prevalence in the U.S.⁸

Age (years)	% of Population
Adults aged 20 and up	41.90%
Adolescents aged 12-19	22.90%
Children aged 6-11	20.70%
Children aged 2-5	12.70%

vincing when describing seemingly miraculous diets. However, the information could just be the opinion of an individual or a promotional company sponsorship.⁵ Unless diet information is published by a credible source, it should be regarded as untrustworthy.

Pause and Ponder: How many times a week do you see diet-related content on social media?

Fad Diet Prevalence

Approximately 45 million Americans (about 14% of the total population) go on a diet each year.⁷ Of these diets, 50% are fad diets.⁷ According to the United States (U.S.) Weight Loss & Diet Control Market, the weight loss industry is one of the most advertised with investors spending \$66 billion annually.⁷ More people than ever are overweight or obese and using diets as a solution. **Table 1** summarizes obesity’s prevalence, which is rising each year in the U.S.

According to the Centers for Disease Control and Prevention (CDC), individuals who are overweight or have obesity are at elevated risk for many health issues. These include elevated cholesterol, stroke, heart disease, hypertension, cancer, type 2 diabetes, mental illness, low quality of life, and mortality, among others.⁹ While many factors can influence weight, individuals can adapt their diets to meet nutritional needs and make long-term differences to improve health outcomes.

TYPES OF FAD DIETS

As the definition implies, fad diets’ popularity increases and decreases with current trends. This section discusses some of the most popular current fad diets.

Intermittent Fasting

Individuals following an intermittent fasting diet alternate eating and fasting (not eating or drinking anything) on a cyclic schedule. This diet focuses more on eating during specific periods of time than restricting meal components. Various intermittent fasting schedules exist, but popular versions include alternate-day and time-restricted fasting.^{10,11} Alternate-day fasting means fasting every other day, while time-restricted fasting involves eating within set time windows during the day. Individuals should consult a doctor and choose the type of intermittent fasting that best fits their health needs (but most do not). Studies show fol-

lowing intermittent fasting schedules leads to decreased body weight, body mass index (BMI), and waist circumference.¹¹ Studies also show improved blood glucose and triglyceride levels following this diet.¹⁰

The body uses ingested calories—specifically carbohydrates, sugars, and nutrients—as fuel.¹⁰ If people eat continuously throughout the day, the body uses ingested calories as fuel to perform necessary bodily functions. The body stores unused ingested calories in the form of fat where they become an energy reserve.^{10,12}

When the period between meals lengthens and the body lacks a constant supply of calories for fuel, it turns to the fat reserve to burn fat stored in the body. The theory is that the longer a person goes without eating, the more the body will use its fuel reserve. The more reserve is used, the more fat is burned.¹⁰ As more of the reserve is used for energy while intermittent fasting, more weight is lost through fat burn.

Intermittent fasting regulates eating times without restricting foods or food groups. Dieters must make conscious choices to include foods beneficial to health. This includes fruits, vegetables, plant proteins or lean meats, whole grains, superfoods (see [Sidebar: Superfoods](#)), and low-fat dairy options.¹² Healthy choices also include limiting processed foods and sugars.

Pause and Ponder: Do patients ask about superfoods when discussing dietary information or supplements? Do you know which to recommend?

Pros and Cons

Like most diets, intermittent fasting has benefits and drawbacks. Following intermittent fasting correctly boosts memory, improves blood pressure, induces fat loss while maintaining muscle mass, helps prevent obesity, improves type 2 diabetes by reducing insulin resistance, and improves tissue health.^{12,14} Intermittent fasting also regulates the body's 24-hour cycle to improve physiological functioning and metabolic health. As a result, gastrointestinal (GI) microbiomes, energy levels, and sleep may improve.¹⁵

Drawbacks of this diet include issues with long-term maintenance/adherence, leading to regaining weight.¹⁰ It is difficult and tiring for individuals to maintain fasting for extended periods. In addition, until the body is accustomed to fasting periods, symptoms such as headaches, nausea, or dizziness may occur. Some individuals may feel an initial decrease in energy levels when starting this diet.¹⁰

Keto Diet

The keto diet, also known as the ketogenic diet, is centered around depriving the body of carbohydrates.¹⁶ Researchers originally developed the ketogenic or keto diet in the 1920s as an epi-

Sidebar: Superfoods¹³

Superfoods are nutrient-rich and high in important dietary components including antioxidants, vitamins, minerals, fiber, and healthy fats. These help keep the body functioning, reduce disease risk, and improve well-being. Some examples of superfoods are

- Avocados → These include potassium and healthy fats to lower the risk of heart disease.
- Chia seeds → These include fiber, protein, antioxidants, vitamins, and minerals. They are also easy to add to recipes.
- Dark and leafy greens → All greens are good greens, but these are especially nutrient dense, including vitamins A, C, and E. They also contain vitamin K, which promotes bone health.
- Ginger → This includes vitamin C, magnesium, and potassium. It also helps reduce pain and aid nausea.
- Salmon → Fish is high in omega-3 fatty acids, which can help reduce heart disease.
- Yogurt → This includes calcium and protein to help with bone health, cancer prevention, and immune health. It is also a good source of probiotics to support gut health.

lepsy treatment, especially for resistant pediatric cases.¹⁷ The rise of effective antiepileptic drugs and treatments decreased use of the ketogenic diet for this purpose. As originally designed, total daily calories were composed of high fat intake (70% to 80%), moderate amounts of protein (10% to 20%), and low carbohydrate intake (5% to 10%).¹⁶ An iteration of this diet has gained more traction since the 1990s, as people realized its effectiveness for quick weight loss.¹⁶

The keto diet helps with weight loss through the processes of gluconeogenesis and ketogenesis. Under normal circumstances, carbohydrates produce energy for the body.¹⁶ When insufficient carbohydrates are available, insulin secretion is reduced and glucose is less available. The body then exploits gluconeogenesis, using lactic acid, glycerol, and amino acids to produce glucose as an energy source.¹⁶

If carbohydrate levels drop further, the body enters ketogenesis and secretes ketone bodies as an alternative energy source.¹⁶ As insulin secretion levels remain low and ketone bodies are used for energy, fat and glucose storage falls significantly. This can cause other fats to break down, leading to bodily fat loss.¹⁶

To remain in ketogenesis, the body needs constant carbohydrate deprivation.¹⁶ The longer it is deprived of carbohydrates, the more fat is burned in the ketotic state. This is known as nutritional ketosis and is considered safe, as opposed to the metabolic state of ketoacidosis (an accumulation of ketones that increases the blood's acidity), which can be life-threatening.¹⁶

During ketoacidosis, ketone bodies are produced in large amounts and can acidify the blood pH.¹⁶ Acidic blood pH reduces the amount of oxygen blood delivers to cells leading to cell death and life-threatening complications. Insulin keeps the production of ketone bodies at bay, so sometimes people with type 1 diabetes develop ketoacidosis due to decreased insulin production. Taking diabetes-related medication correctly reduces the risk of ketoacidosis in people with diabetes. Following a low carbohydrate diet for a prolonged amount of time can also lead to ketoacidosis.¹⁷ To reiterate, ketogenesis is the production of ketone bodies in response to carbohydrate and glucose depletion. Low concentrations of ketone bodies are generally regarded as safe, as opposed to high concentrations caused by ketoacidosis (which is a medical emergency).¹⁶

What to Eat and Avoid

Given the strong emphasis on high-fat foods, healthy fats comprise the largest part of this diet.¹⁶ Foods such as seeds and nuts, coconut, avocados, poultry fat, and plant fats (e.g., olive or coconut oils) are encouraged. In addition, some dairy products—including butter, hard cheese, and yogurt—are allowed, but people on a ketogenic diet should avoid cream, ice cream, and full-fat milk given their natural sugar content.¹⁷ Individuals following this diet should consume a moderate amount of protein, ideally meats high in omega-3 fats.¹⁶ This includes grass-fed beef, free-range poultry, wild-caught fish, and pork. Nuts, seeds, tofu, and eggs are also acceptable protein sources.¹⁷

Adhering to a diet with less than 10% of calories from carbohydrates can be challenging, especially since this diet requires individuals to calculate “net carbs” (See **Sidebar: What are “Net Carbs”?**).¹⁶ Vegetables lacking high starch contents (e.g., cauliflower, broccoli, onions, leafy greens, bell peppers, garlic, mushrooms, cucumber, summer squash) are encouraged. Small portions of fruit are also allowed, and fruits with a lower net carb content (e.g., berries) are preferred. Other acceptable carbohydrates include dark chocolate, herbs, spices, unsweetened tea, coffee, vinegars, and mustards.¹⁷

Foods containing added sugar, whole or refined grains, and flour products are restricted.¹⁷ Starchy foods are also not allowed, including some high-starch vegetables such as corn, potatoes, and winter squash. Fruits with a high net carb content and fruit juices are restricted. Most keto programs also advise against alcoholic beverages due to their carbohydrate content and added sweeteners.¹⁷

Pros and Cons

The keto diet may be beneficial for weight loss, as it uses ketone bodies for energy to deplete glucose and fat storage abilities. Decreasing sugar intake lowers the risk of developing diabetes, obesity, and metabolic syndrome.¹⁶ Following this diet may reduce cholesterol, blood sugar, and blood pressure, and decrease insulin resistance.¹⁷

Sidebar: What are “Net Carbs”?¹⁷

The body cannot digest or metabolize some carbohydrates because of their molecular structures. For example, fruits, vegetables, whole grains, and sugar alcohols contain insoluble fibers that are indigestible. Insoluble carbs have no energy value or blood sugar impact, so they are allowed when following the keto diet. The keto diet requires dieters to calculate “net carbs,” the amount of carbohydrates taken in by the body that are digested and metabolized and thus contribute to calories. However, it is important to note that the total calorie level does not change even when “net carbs” are calculated.

Individuals calculate net carbs by subtracting the number of ingestible carbohydrates from the food’s total amount of carbohydrates. For example, food containing 24 total carbohydrates and 21 ingestible carbohydrates equals 3 net carbs. Ingestible carbohydrates can typically be found by subtracting the amount of fiber from the amount of carbohydrates in the food item, but it can be more complicated. A number of online net carb calculators are available to help.

Net carbs are also known as “impact carbs.” Food manufacturers use both terms as marketing strategies, but governing bodies do not regulate use of these phrases.

Diet restrictions may cause short-term adverse effects such as nausea and vomiting, fatigue, headaches, dizziness, and insomnia.¹⁶ This is known as the “keto flu.” Symptoms usually resolve once the body adjusts to the diet after a few weeks. Fluids and electrolyte replenishment can help alleviate discomfort during this period.¹⁶

Documented long-term adverse effects include increased uric acid levels in the blood, increased risk of kidney stones, and osteoporosis.¹⁷ This is due to the diet’s restrictive nature and omission of necessary components to sustain a healthy diet. Nutrient deficiencies can occur as a result of following this diet.¹⁷

People struggle to adhere to the ketogenic diet due to strict regulation of fat, protein, and carbohydrates.¹⁷ Dieters must carefully monitor their adherence to intake limits and meet target levels. This can be difficult for individuals to maintain long-term and lead to low adherence to the diet.¹⁷

Pay-for-Food Systems

Pay-for-food diets are meal prep services or meal delivery services with pre-portioned ingredients, pre-cooked meals, or meal replacement options. Diets focus on weight loss and are designed for convenience. These options take the guesswork out of planning meals and make it easier to track eating.

Nutrisystem

The Nutrisystem meal service claims its diets help with weight loss through a high-protein and low glycemic approach.¹⁸ Nutrisystem expects users to lose one to two pounds a week by managing blood sugar and controlling hunger to avoid overindulgence. Dietitians design meals to include healthy options and relieve the stress of planning.¹⁸

Meals are pre-portioned to fit an individual's needs and tastes.¹⁸ The meals' composition of lean protein, healthy fat, and smart carbohydrate ingredients is supposed to curb hunger. Protein shakes and bars are options to supplement plans. Nutrisystem claims deprivation is too restrictive and allows for some deviation from the plan or healthy alternatives to "bad foods." In addition, dieters can track their progress and calories using Nutrisystem's app. This system promotes prizes and special offers to keep individuals motivated.¹⁸

Prices vary by plan type but can range from \$9.99 to \$15.18 a day. Nutrisystem has plans designed specifically for men, women, partners, and people with diabetes.¹⁸

SlimFast

When SlimFast originated, the system promoted meal replacement shakes to lose weight.¹⁹ The company has since expanded to include drink mixes, snacks, and meal replacement bars. The products are grouped into categories such as calorie control, high protein, keto, and intermittent fasting. The website also contains a recipe section for dieters to use in their meal planning.¹⁹

SlimFast plans are based on individuals' goals and preferences, including the Favorite Foods Plan, Keto Plan, High Protein/Low Carb Plan, Original Plan, and Intermittent Fasting.¹⁹ Dieters purchase SlimFast products to supplement or replace parts of their current diet. Plans themselves are not priced because individuals buy their own groceries and supplement with SlimFast products associated with the plan of their choice. The company also has an app to use for weight management tracking and a private Facebook group to communicate with other individuals on the diet to offer support or guidance.¹⁹ SlimFast claims their plans and products promote and maintain weight loss and encourage people to make better food choices.¹⁹

Jenny Craig

The Jenny Craig company has recently gone out of business after 40 years in the industry. Some experts indicate that one reason has been the availability of weight loss medications and increased competition in this market space. This system emphasized one-on-one coaching mixed with healthy foods to lose weight quickly.²⁰ The company claimed dieters could lose up to 18 pounds in the first four weeks. Coaches designed meal plans to be unrestrictive and included an individual's favorite foods. Meals focused on low-fat foods with high fiber and protein. This

program also emphasized physical activity and occasional intermittent fasting to aid the weight loss process.²⁰

Plans consisted of meals from the program, two snacks, and supplemental grocery items daily to promote weight loss and increase metabolism.²⁰ One snack included Jenny Craig's Recharge Bar, used when intermittent fasting. The program claimed the Recharge Bar helped dieters lose weight faster, feel less hungry, and maintain fasting. Jenny Craig coaches designed plans and provided guidance for the duration of the program.²⁰

Food was delivered weekly or biweekly. Depending on the type of plan, individuals paid \$13.99 to \$21.99 per day. Prices were based on the number of meals, membership length, and amount of coaching support included. Promotional offers and meal bundles were available.²⁰

Pros and Cons

Pay-for-food diets can be intriguing as they promote healthy choices, weight loss, and convenience.¹⁸⁻²⁰ They reduce mental load and stress surrounding dieting by making the choices easier or eliminating the need to choose altogether. Some services also provide support groups or coaches for accountability and guidance. In addition, if dieters can adhere to these plans, meal kits promote portion control and reduce overeating.¹⁸⁻²⁰

A major con associated with these diets and meal kits is adherence. As people lose weight on these diets, they may stop using them, gain weight back, and become discouraged about trying again. This can reverse improved health outcomes.¹⁸⁻²⁰ Another con is cost. Individuals may be discouraged by the prices associated with pay-for-food systems. The cost may not be viable or sustainable options for all individuals.¹⁸⁻²⁰

Studies have shown these diets to be ineffective. Attrition rates (percentages of people leaving a program) are 30% or greater, and 37% of dieters who complete programs lose less than 5% of their initial body weight.²¹ Other studies failed to produce significant results for how these pay-for-food diets affect weight loss when compared to educating or counseling individuals on weight.²² High attrition rates and insignificant weight loss results suggest these diets are unsustainable and unreliable.²¹

Paleo Diet

The paleo diet goes by many names, including the Paleolithic, caveman, or Stone-Age diet. It consists of (allegedly) eating like humans of the Paleolithic era did, mixed with modern components to supplement the diet. The Paleolithic era occurred from roughly 2.5 million years ago to 1,200 B.C. Diet supporters believe current body function is similar to how it functioned during this era and eating foods available or comparable to this time will improve health.²³ Introduced in 2002 by Dr. Loren Cordain, a scientist specializing in nutrition, this diet has surged in popularity in recent years due to weight loss claims.²⁴



Due to disagreements about which foods were available in the Paleolithic era compared with today, many diet plans are dubbed “paleo.” They differ in specific foods allowed. All plans emphasize high protein, healthy fats, low or moderate carbohydrates, low sugar and sodium, and high fiber to meet weight loss goals.²³ The term “paleo” will be used to describe this model. The paleo diet consists of consuming mostly lean meats, fruits, vegetables, nuts, seeds, and fish, in line with what researchers believe was consumed during the Paleolithic age.²³ It also emphasizes reducing intake of dairy, grains, and carbohydrates.²⁵

Weight loss can occur through several pathways using the paleo diet.²³ Like the keto diet, ingesting fewer carbohydrates forces the body to use fat for fuel. In addition, replacing highly processed foods, added sugars, and large amounts of carbohydrates with healthier options can aid weight loss. Eating more protein and less calorically dense food (i.e., few calories in a large volume of food) also helps curb hunger and leave individuals more satisfied.²³

Less calorically dense foods—including vegetables, fruits, low-fat or fat-free dairy, and egg whites—can be eaten in larger quantities. These foods help with weight loss as they allow individuals to eat a larger volume and feel full, without ingesting large numbers of calories.²⁶ This reduces snacking and overall food intake.²³

Conversely, calorically dense foods are high in calories and eaten in small amounts. These contribute weight gain as individuals who eat a small volume consume high numbers of calories.²⁷ Examples of calorically dense foods include²⁷

- Proteins: fish, beans, eggs, cheese, yogurt, fats including nuts, avocados, nut butters
- Carbohydrates: potatoes, brown rice, whole grains

Overall, the paleo diet works by breaking down the diet into basic components and making healthier choices. Cutting out foods leading to high glucose or carbohydrate storage also aids in eating healthier and inducing weight loss.²⁸

What to Eat and Avoid

Allowed foods emphasize fresh and healthy choices to remain consistent with foods found in the Paleolithic age.²³ This includes lean meats, fish or shellfish, fruit, vegetables, honey, nuts or seeds, and olive or coconut oils. Frozen fruits and vegetables are allowed as they contain the same nutrients as the fresh variety and may be more convenient. Omega-3 fats are important for the body and can be found in fish, grass-fed beef, avocado, olive oil, some nuts (e.g., walnuts, almonds, pistachios), and seeds. Root vegetables such as cassava and sweet potatoes are highly nutritious and are allowed in moderation.²³

Restricted foods have little nutritional value or a high glycemic index unsuitable for the paleo diet.²³ For example, white potatoes and processed foods are off limits. Other restricted foods include whole or refined grains, cereals, refined sugar, refined vegetable oil, legumes, dairy products, alcohol, coffee, and salt. Canola is a refined vegetable oil and is not allowed. Restricted legumes include peanuts, beans, and lentils.²³

This diet emphasizes eating healthy and portioning fats, proteins, and carbohydrates to enhance health.²³ Calorie counting and general portion control are deemphasized in this diet. Some plans also allow for “cheat meals” (those consisting of food not beneficial to health) in the early stages of the diet to increase adherence.²³

Pros and Cons

Components of this diet including fiber, potassium, and antioxidants aid bodily functions and reduce disease risk. Reducing the intake of highly processed foods with little nutritional value also

helps improve overall health.²⁵ Short-term benefits may include weight loss, improved blood pressure and cholesterol levels, and increased insulin sensitivity.²³ One study documented improvements in metabolic levels, specifically glucose control and lipids, in people with diabetes.²⁸

Unfortunately, restricting or excluding foods altogether for long periods of time can lead to nutritional deficiencies and health complications. For example, limiting dairy intake leads to deficiencies of calcium, vitamin D, and B vitamins.²³ These deficiencies can increase risk of osteoporosis and bone injuries.²⁴ Dairy-related nutrient deficiencies are not specific to the paleo diet, but can occur due to its food restrictions. Restricting grains in the diet also deprives the body of nutrients, which increases risks of diabetes and heart disease. In addition, increased meat consumption (especially red meat) contributes to saturated fat intake and increases risks of cardiovascular problems and diabetes.²³ It may also be difficult for people to adhere to a diet that restricts certain categories of foods.

Atkins Diet

The Atkins diet promotes low carbohydrate intake while allowing as much protein and fat as desired. Robert C. Atkins, a heart specialist, developed this diet in the 1960s as a method for weight loss and maintenance.³⁰ Although it is a low-carb diet, the Atkins program acknowledges that eating right is always better than eating less.³¹ This diet is ever evolving to be current with updated nutritional expertise.³⁰

Like the keto diet, Atkins emphasizes low carbohydrate intake of less than 20 g per day to start.³⁰ Unlike the keto diet, consumption of fat and protein is less restricted. Carbohydrates are claimed as the problem without regulating the intake of other food groups. Diet supporters believe the sugars found in carbohydrates cause health issues such as blood sugar imbalances and weight gain.³⁰

Hypothetically, eating fewer carbohydrates lowers dietary sugar leading to greater satiety, increased energy, less stored fat, and higher metabolism.³¹ When the body lacks glucose and carbohydrates to use as energy, it turns to fat to keep the body functioning through ketogenesis. The more fat a person burns, the more weight they lose.

Fat and protein comprise the remainder of the diet. As carbohydrates are viewed as the source of health issues, intake levels of fat and protein are less restricted. Calorie counting and portion control are unnecessary, besides keeping track of carbohydrate intake to stay below the allowable limit.³⁰

The Atkins diet is split into phases with specific allowable limits of carbohydrates (see **Table 2**). The diet's phases adjust to reflect changes in body function and weight. As carbohydrate levels fluctuate in each phase, protein and fat levels change to achieve satiety.

While phases differ in carbohydrate intake levels, they include similar food groups overall.³⁰ Allowed foods include vegetables, oils, fats, and protein (e.g., eggs, cheese, fish, meat and poultry). Dieters can introduce berries, nuts, seeds, starchy vegetables, and whole grains in the third phase, provided they are still losing weight. Dieters can also eat Atkins' commercial selection of products during and after phase two. Most fruits, alcohol, baked goods high in sugar, bread, pasta, and nuts are restricted in phase one. Some fruits and grains are added by phase three.³⁰

Pros and Cons

Benefits of the Atkins diet include weight loss; decreased blood pressure; and lower incidence of heart disease, metabolic syndrome, and diabetes.³⁰ This diet can also improve blood sugar and cholesterol levels. These benefits are attributed to low carbohydrate intake and subsequent weight loss.³⁰

Reducing carbohydrate intake may initially cause symptoms such as headache, weakness, fatigue, and dizziness.³⁰ Unrestricted fat intake can be unhealthy. In addition, using fat as the body's energy source for too long may lead to ketoacidosis if dieters misuse the plan.²⁹ Nutrient deficiency can also occur on this diet as a result of restrictions.³⁰

Weight loss pursuant to this diet is difficult to maintain due to its deficiencies and restrictive nature. Following the carbohydrate limit for long periods of time is difficult and unsustainable for some people.³⁰ Cardiologists warn this diet puts oxidative stress (disproportionate levels of oxygen reactive species overwhelming the ability of body systems to detoxify them) on organs and

Table 2. Atkins Diet Phases³¹

Phase	Instructions
Phase 1: Induction	3 regular sized meals or 4-5 small meals, vitamins/supplements, 8 oz. glasses of water, 20 g net carbs per day
Phase 2: Ongoing weight loss	Can add net carbs in 5 g increments weekly, vitamins/supplements, 8 oz. glasses of water, no more than 40 g a day after adding extra carbs, introduce Atkins food products
Phase 3: Pre-Maintenance	Maintaining previous stages, can add net carbs in 10 g increments weekly to find the perfect balance until the goal weight is reached, maintain carb intake of goal weight
Phase 4: Maintenance	Maintaining Phase 3 carb level, reducing fat intake as carb intake increases, managing cravings and weight

can cause serious heart problems or fatal complications.²⁹ Some long-term studies have shown the Atkins diet is no more effective than other fad diets. In addition, these studies show that most people who lost weight while following the Atkins diet regained it.³⁰

IMPLICATIONS FOR PHARMACY TEAM

Fad dieting can compromise patient safety, and certain patients are at elevated risk for problems. Pharmacy teams are responsible for advising patients about drug-diet interactions and concerns. **Table 3** describes conditions and their associated medications that impact the use of fad diets.

Pause and Ponder: Do you think fad diets are helpful or harmful?



©Can Stock Photo/cteconsulting

Table 3. Implications for Pharmacy Teams^{10,16,23,30,32-40}

Diet	Patient Conditions and Associated Medications That Can Be Contraindications with Diets
Intermittent Fasting	<ul style="list-style-type: none"> • Age younger than 18 years • Pregnancy or breastfeeding • Type 1 diabetes <ul style="list-style-type: none"> □ Insulin, blood pressure medication, cholesterol-lowering medication • History of eating disorder
Keto	<ul style="list-style-type: none"> • Diabetes <ul style="list-style-type: none"> □ Insulin, blood pressure medication, cholesterol-lowering medication • Hypoglycemia <ul style="list-style-type: none"> □ Glucagon or other forms of glucose • Pancreatitis <ul style="list-style-type: none"> □ Pain medication • Liver failure • Fat metabolism disorders <ul style="list-style-type: none"> □ Cholesterol-lowering medication • Primary carnitine deficiency <ul style="list-style-type: none"> □ L-carnitine supplements • Carnitine palmitoyltransferase deficiency • Carnitine translocase deficiency • Porphyrias <ul style="list-style-type: none"> □ Hemin • Pyruvate kinase deficiency <ul style="list-style-type: none"> □ Mitapivat (Pyrukynd), folic acid supplements, iron chelators
Pay-For-Food Systems	<ul style="list-style-type: none"> • Contraindications and associated medication will depend if it is an individually designed plan or the service’s version of intermittent fasting, keto, etc.
Paleo	<ul style="list-style-type: none"> • Cardiovascular related issues <ul style="list-style-type: none"> □ Anticoagulants, ACE inhibitors, cholesterol-lowering medications, diuretics, etc. • Diabetes <ul style="list-style-type: none"> □ Insulin, blood pressure medication, cholesterol-lowering medication • Nutrient deficiency disorders
Atkins	<ul style="list-style-type: none"> • Diabetes <ul style="list-style-type: none"> □ Insulin, blood pressure medication, cholesterol-lowering medication • Taking diuretics <ul style="list-style-type: none"> □ Thiazide, loop, potassium-sparing diuretics or a mix of types • Severe kidney disease <ul style="list-style-type: none"> □ Blood pressure medication, anemia medication, cholesterol-lowering medication, supplements • Pregnancy or breastfeeding

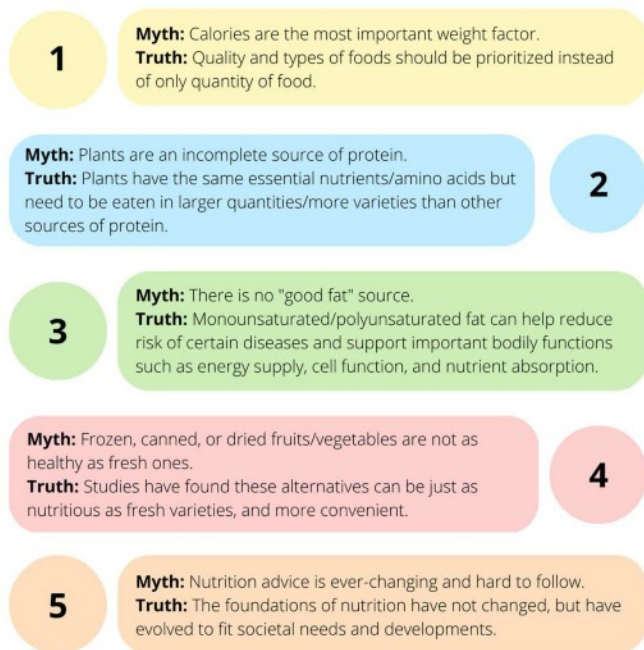


Figure 1. Nutritional Myths and Their Truths³²

Nutritional Myths

As mentioned, misinformation surrounding diets has always existed, and social media has magnified the problem. Some myths are more harmful than others, but knowing the facts is essential to correctly informing others.³² Examples of nutritional myths that pharmacy teams can debunk for their patients are found in **Figure 1**.

Dieting is not a one-size-fits-all solution. When pharmacy teams advise patients, they must work with patients to consider health factors. Factors to consider include a patient’s medications, lifestyle choices, and known health issues.³³ Pharmacy teams should advise individuals that fad diets are not necessary and following a generally healthy diet is usually sufficient to lose weight. They should make healthy swaps and find strategies that work best for them as individuals. For example, they can cut back on processed foods, consume more fruits and vegetables, and be conscious of fat or carbohydrate intake to ensure healthy sources. These choices are effective ways to achieve the long-term goals without employing fad diets that promote quick fixes.³³

CONCLUSION

Fad diets are undeserving of the positive hype they receive. They are short-term solutions that sometimes work for people looking to lose weight or make changes quickly. However, benefits are outweighed by their unsustainability and poor post-diet maintenance planning. Fad dieting also starts a cycle of yoyo dieting (see **Sidebar: Yoyo Dieting**). The best option for health is to find strategies that work individually and stick with them. Ditch the fad diets and make long-term healthy choices for better, lasting results.³³ **Figure 2** summarizes key points.

Sidebar: Yoyo Dieting

Yoyo dieting, or weight cycling, occurs when people achieve their goal weight through dieting, stop dieting and return to unhealthy habits, gain the weight back, diet again for a period, gain the weight back, and repeat the cycle. Yoyo dieting is not only a conscious choice. Physiological mechanisms related to energy intake and expenditure, genetics affecting weight control processes, and the interaction between genes and the environment also affect the cycle.³⁴

Yoyo dieting lacks substantial or sustainable changes to lifestyle or nutrition to keep weight off and instead focuses on quick fixes.³⁴ These quick fixes ultimately fail when weight is regained, and the cycle continues. Most weight lost is gained back within the first two to three years after dieting ceases. However, if dieters keep weight off for two years, the likelihood of gaining it back decreases.³⁵

Resources for Pharmacists and Pharmacy Technicians

- CDC Resources - Healthy Weight, Nutrition, and Physical Activity³⁶
<https://www.cdc.gov/healthyweight/tools/index.html>
- USDA - Healthy Living and Weight³⁷
<https://www.nutrition.gov/topics/healthy-living-and-weight>

Figure 2. Patient Safety When Fad Diets are in Play!

Best

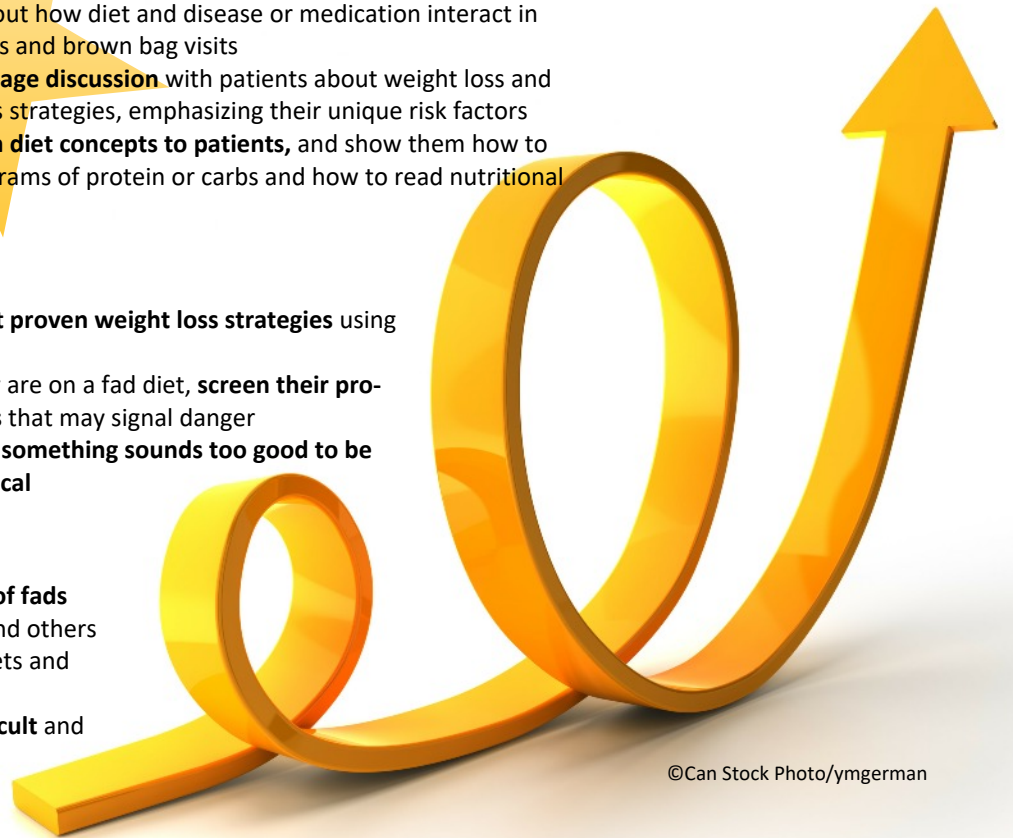
- 1 **Be COMMUNITY CHAMPIONS!** Actively educate your community about how diet and disease or medication interact in newsletters and brown bag visits
- 2 **Encourage discussion** with patients about weight loss and weight loss strategies, emphasizing their unique risk factors
- 3 **Explain diet concepts to patients**, and show them how to calculate grams of protein or carbs and how to read nutritional labels

Better

- 1 **Post information about proven weight loss strategies** using patient-friendly language
- 2 When patients say they are on a fad diet, **screen their profiles for diseases and drugs** that may signal danger
- 3 Remind patients that **if something sounds too good to be true, they should be skeptical**

Good

- 1 **Be familiar with the most popular of fads diets**, like Atkins, the paleo, the keto and others
- 2 **Scan social media** and watch for diets and dieting trends
- 3 **Appreciate that weight loss is difficult** and may people want fast results



©Can Stock Photo/ymgerman

REFERENCES

1. Wdowik M. The long, strange history of dieting fads. Colorado State University. November 13, 2017. Accessed January 14, 2023. <https://source.colostate.edu/the-long-strange-history-of-dieting-fads/>
2. Tahreem A, Rakha A, Rabail R, et al. Fad Diets: Facts and Fiction. *Front Nutr*. 2022;9:960922. Published 2022 Jul 5. doi:10.3389/fnut.2022.960922
3. Foxcroft L. Introduction: 'The Price of a Boyish Form'. In: *Calories and Corsets: A History of Dieting over Two Thousand Years*. Profile Books; 2011:1-8.
4. British Dietetic Association (BDA). Fad diets: Food fact sheet. September 2021. Accessed January 16, 2023. <https://www.bda.uk.com/resource/fad-diets.html>
5. British Dietetic Association (BDA). Fad diets and Instagram – friend or foe? March 2019. Accessed January 16, 2023. <https://www.bda.uk.com/resource/fad-diets-and-instagram-friend-or-foe.html>
6. Gans, K. Fad diets through the decades. U.S. News. December 23, 2019. Accessed January 17, 2023. <https://health.usnews.com/health-news/blogs/eat-run/articles/fad-diets>
7. Johnson J. Fad diets are bad diets. American Council on Science and Health. July 2, 2018. Accessed January 20, 2023. <https://www.acsh.org/news/2018/07/02/fad-diets-are-bad-diets-13134>
8. Centers for Disease Control and Prevention. Obesity and overweight. Updated January 5, 2023. Accessed January 20, 2023. <https://www.cdc.gov/nchs/fastats/obesity-overweight.htm>
9. Centers for Disease Control and Prevention. Health effects of overweight and obesity. Updated September 24, 2022. Accessed January 20, 2023. <https://www.cdc.gov/healthyweight/effects/index.html>
10. Johns Hopkins Medicine. Intermittent fasting: What is it, and how does it work? Accessed January 23, 2023. <https://www.hopkinsmedicine.org/health/wellness-and-prevention/intermittent-fasting-what-is-it-and-how-does-it-work>
11. Chair SY, Cai H, Cao X, Qin Y, Cheng HY, Ng MT. Intermittent fasting in weight loss and cardiometabolic risk reduction: A randomized controlled trial. *J Nurs Res*. 2022;30(1):e185. doi:10.1097/jnr.0000000000000469
12. UC Davis Health. Intermittent fasting: Benefits, how it works, and is it right for you? February 4, 2022. Accessed January 23, 2023. <https://health.ucdavis.edu/blog/good-food/intermittent-fasting-benefits-how-it-works-and-is-it-right-for-you/2022/02>
13. Cleveland Clinic. What is a superfood, anyway? November 10, 2021. Accessed January 23, 2023. <https://health.clevelandclinic.org/what-is-a-superfood/>
14. de Cabo R, Mattson MP. Effects of intermittent fasting on health, aging, and disease [published correction appears in *N Engl J Med*. 2020 Jan 16;382(3):298] [published correction appears in *N Engl J Med*. 2020 Mar 5;382(10):978]. *N Engl J Med*. 2019;381(26):2541-2551. doi:10.1056/NEJMra1905136
15. Patterson RE, Laughlin GA, LaCroix AZ, et al. Intermittent fasting and human metabolic health. *J Acad Nutr Diet*. 2015;115(8):1203-1212. doi:10.1016/j.jand.2015.02.018
16. Masood W, Annamaraju P, Uppaluri KR. Ketogenic Diet. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; June 11, 2022. Updated June 11, 2022. Accessed January 24, 2023. <https://www.ncbi.nlm.nih.gov/books/NBK499830/>
17. Harvard T.H. Chan School of Public Health. Diet Review: Ketogenic diet for weight loss. May 22, 2019. Accessed January 24, 2023. <https://www.hsph.harvard.edu/nutritionsource/healthy-weight/diet-reviews/ketogenic-diet/>
18. Nutrisystem. Accessed January 25, 2023. <https://www.nutrisystem.com>
19. SlimFast. Accessed March 9, 2023. <https://slimfast.com>
20. Jenny Craig. Accessed January 25, 2023. <https://www-prd.jennycraig.com/how-it-works>
21. McEvedy SM, Sullivan-Mort G, McLean SA, Pascoe MC, Paxton SJ. Ineffectiveness of commercial weight-loss programs for achieving modest but meaningful weight loss: Systematic review and meta-analysis. *J Health Psychol*. 2017;22(12):1614-1627. doi:10.1177/1359105317705983
22. Chaudhry ZW, Doshi RS, Mehta AK, et al. A systematic review of commercial weight loss programmes' effect on glycemic outcomes among overweight and obese adults with and without type 2 diabetes mellitus. *Obes Rev*. 2016;17(8):758-769. doi:10.1111/obr.12423
23. Harvard T.H. Chan School of Public Health. Diet Review: Paleo diet for weight loss. October 28, 2019. Accessed January 26, 2023. <https://www.hsph.harvard.edu/nutritionsource/healthy-weight/diet-reviews/paleo-diet/>
24. The Paleo Diet. Accessed January 26, 2023. <https://thepaleodiet.com/>
25. UC Davis Health. Paleo diet: What it is and why it's not for everyone. April 27, 2022. Accessed January 26, 2023. <https://health.ucdavis.edu/blog/good-food/paleo-diet-what-it-is-and-why-its-not-for-everyone/2022/04>
26. Weight loss: Feel full on fewer calories. Mayo Clinic. March 22, 2022. Accessed January 26, 2023. <https://www.mayoclinic.org/healthy-lifestyle/weight-loss/in-depth/weight-loss/art-20044318>
27. Cleveland Clinic. High calorie foods and snack ideas to gain weight. September 15, 2020. Accessed January 26, 2023. <https://my.clevelandclinic.org/health/articles/16555-snack-ideas-for-weight-gain>
28. Masharani, U., Sherchan, P., Schloetter, M. et al. Metabolic and physiologic effects from consuming a hunter-gatherer (Paleolithic)-type diet in type 2 diabetes. *Eur J Clin Nutr* 69, 944–948 (2015). <https://doi.org/10.1038/ejcn.2015.39>
29. Parmar RM, Can AS. Dietary Approaches To Obesity Treatment. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; October 3, 2022. Accessed January 27, 2023. <https://www.ncbi.nlm.nih.gov/books/NBK574576/>
30. Atkins diet: What's behind the claims? Mayo Clinic. May 12, 2022. Accessed January 27, 2023. <https://www.mayoclinic.org/healthy-lifestyle/weight-loss/in-depth/atkins-diet/art-20048485>
31. Atkins. Accessed January 27, 2023. <https://www.atkins.com/how-it-works>
32. Type 1 diabetes. Mayo Clinic. Accessed March 10, 2023. <https://www.mayoclinic.org/diseases-conditions/type-1-diabetes/diagnosis-treatment/drc-20353017>
33. American Diabetes Association. Hypoglycemia (low blood glucose). Accessed March 10, 2023. <https://diabetes.org/healthy-living/medication-treatments/blood-glucose-testing-and-control/hypoglycemia>
34. Natesan V, Kim SJ. Lipid Metabolism, Disorders and Therapeutic Drugs - Review. *Biomol Ther (Seoul)*. 2021;29(6):596-604. doi:10.4062/biomolther.2021.122

35. Health Resources & Services Administration. Primary carnitine deficiency. Accessed March 10, 2023.
<https://newbornscreening.hrsa.gov/conditions/primary-carnitine-deficiency>
36. Porphyria. Mayo Clinic. Accessed March 10, 2023.
<https://www.mayoclinic.org/diseases-conditions/porphyria/diagnosis-treatment/drc-20356072>
37. Cleveland Clinic. Pyruvate kinase deficiency. Cleveland Clinic. Accessed March 10, 2023.
<https://my.clevelandclinic.org/health/diseases/23419-pyruvate-kinase-deficiency>
38. American Heart Association. Types of heart medications. Accessed March 10, 2023. <https://www.heart.org/en/health-topics/heart-attack/treatment-of-a-heart-attack/cardiac-medications>
39. Cleveland Clinic. Diuretics. Accessed March 10, 2023.
<https://my.clevelandclinic.org/health/treatments/21826-diuretics>
40. Mayo Clinic. Chronic Kidney Disease. Accessed March 10, 2023. <https://www.mayoclinic.org/diseases-conditions/chronic-kidney-disease/diagnosis-treatment/drc-20354527>
41. Egan S. 10 Nutrition myths experts wish would die. The New York Times. January 19, 2023. Accessed February 3, 2023.
<https://www.nytimes.com/2023/01/19/well/eat/nutrition-myths.html>
42. Haspel T. Weight-loss diets boil down to one thing, and it's not science jargon. The Washington Post. January 23, 2023. Accessed February 4, 2023.
<https://www.washingtonpost.com/food/2023/01/23/weight-loss-diets-fasting-keto/>
43. Contreras RE, Schriever SC, Pfluger PT. Physiological and epigenetic features of yo-yo dieting and weight control. *Front Genet.* 2019;10:1015. Published 2019 Dec 11.
doi:10.3389/fgene.2019.01015
44. Johns Hopkins Medicine. Maintaining Weight Loss. August 8, 2021. Accessed February 6, 2023.
<https://www.hopkinsmedicine.org/health/wellness-and-prevention/maintaining-weight-loss>
45. Centers for Disease Control and Prevention. Weight Loss and Management. March 19, 2021. Accessed February 6, 2023.
<https://www.cdc.gov/healthyweight/tools/index.html>
46. USDA. Healthy Living and Weight. U.S Department of Agriculture. Accessed February 6, 2023.
<https://www.nutrition.gov/topics/healthy-living-and-weight>