Nutrition Myths and Healthy Dietary Advice in Clinical Practice

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Healthy dietary intake is important for the maintenance of general health and wellness, the prevention of chronic illness, the optimization of life expectancy, and the clinical management of virtually all disease states. Dietary myths (i.e., concepts about nutrition that are poorly supported or contradicted by scientific evidence) may stand in the way of healthy dietary intake. Dietary myths exist about micronutrients, macronutrients, non-nutrients, and food energy. Representative myths of each type include that patients need to focus on consuming enough calcium to ensure bone health, dietary fat leads to obesity and is detrimental to vascular health, all fiber (whether naturally occurring or artificially added) is beneficial, and food calories translate to pounds of body weight through a linear relationship and simple arithmetic. A common theme for dietary myths is a reductionist view of diet that emphasizes selected food constituents as opposed to whole foods. Healthy dietary advice takes a more holistic view; consistent evidence supports recommendations to limit the consumption of ultraprocessed foods and to eat whole or minimally processed foods, generally in a form that is as close to what occurs in nature as possible. Family physicians can help dispel myths for patients and give sound nutritional advice by focusing on actual foods and broader dietary patterns. (*Am Fam Physician*. 2015;91(9):634-638. Copyright © 2015 American Academy of Family Physicians.)

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Author disclosure: No relevant financial affiliations.

What an individual eats is important for the maintenance of general health and wellness and the management of virtually all disease states. Healthy diets are associated with reductions in morbidity and premature mortality.[1] However, much of the dietary information presented as fact is actually myth (i.e., concepts poorly supported or contradicted by the scientific evidence). There are dietary myths about micronutrients (vitamins and minerals), macronutrients (carbohydrates, proteins, and fats), non-nutrients (components of food not currently recognized as essential for growth or maintenance), and food energy (the stored capacity to do work that is often measured in calories). This article will discuss selected common myths in each of these areas.

Dietary Myths

PATIENTS NEED TO FOCUS ON CONSUMING ENOUGH CALCIUM FOR BONE HEALTH

Encouraging calcium consumption for optimal bone health and osteoporosis prevention is a routine part of many clinical visits, especially for female patients. Nonetheless, the role of calcium in strengthening bones is unclear. Americans have among the highest calcium intake in the world, but also one of the highest rates of osteoporosis.[2]

A Cochrane review found that trials of calcium supplementation in children had minimal, if any, effect on bone mineral density.[3] Another Cochrane review including postmenopausal women and older men found that calcium supplements, even with concomitant vitamin D supplementation, had only small effects on fracture prevention; the number needed to treat (NNT) to prevent one hip fracture was approximately 1,000 for those living in the community and about 111 for nursing home residents.[4] Although the U.S. Preventive Services Task Force does not make a stand-alone recommendation on calcium, it concludes that the evidence is insufficient to recommend vitamin D supplementation, with or without calcium, to prevent fractures in noninstitutionalized women or men.[5]

The small chance of benefit with supplemental calcium may be outweighed by the

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	*Evidence rating*	*References*
Supplemental calcium has limited efficacy in the prevention of bone fracture (NNT = 1,000 in community-dwelling women, NNT = 111 in nursing home residents).	A	4, 5, 8
Supplemental calcium increases the risk of kidney stones, and possibly cardiovascular events and hip fracture.	B	6-8, 10
Diets higher in fat produce and sustain as much or more weight loss than lower-fat or calorie-restricted diets.	A	17-20
Ultraprocessed foods containing saturated fat (e.g., preserved meat) are associated with increased risk of cardiovascular and all-cause mortality, whereas whole foods containing saturated fat (e.g., dairy products) are inversely associated with incident cardiovascular disease, type 2 diabetes mellitus, and obesity.	B	22, 26-28
Consuming more dietary fiber in the form of whole foods may help prevent cardiovascular disease, diabetes, constipation, and gastrointestinal and breast cancers. Artifically added functional fibers have not been shown to be beneficial.	B	32-37
Maintaining a 3,500-calorie energy deficit per week will not result in 1 lb (0.45 kg) of weight loss per week.	C	43
Maintaining a deficit in energy intake of about 100 calories per day without any other changes may lead to an eventual weight loss of approximately 10 lb (4.5 kg)—50% of the change achieved by one year, and about 95% achieved by three years.	C	45

NNT = number needed to treat.

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.

increased risks of adverse effects, particularly kidney stones and cardiovascular events, even in dosages as low as 500 mg daily.[6,7] Whereas a meta-analysis including older persons showed that the NNT with calcium supplementation to prevent one fracture was 302, the number needed to harm (number needed to cause one major cardiovascular event) was 178.[8]

Other meta-analyses did not find a statistically significant increase in cardiovascular risk with calcium supplementation,[9] but suggested that it may actually increase the risk of hip fracture.[10]

Patients should be informed about the lack of evidence to support calcium supplements for bone health and the possibility of harm with supplementation (e.g., through pills or unnaturally fortified foods).

Calcium is also found in whole foods, such as dairy. Although consuming dairy foods does not have clear benefits for bone health,[3,11,12] it does not seem to pose risks for kidney stones or cardiovascular events as with artificial forms of calcium supplementation.[6,8]

DIETARY FAT LEADS TO OBESITY AND IS DETRIMENTAL TO VASCULAR HEALTH

Macronutrients are the components of food that supply energy. Because fat is the macronutrient with the highest number of calories per gram, there are concerns that consuming fat will lead to higher calorie intake and obesity. Dietary guidelines have recommended reducing fat intake,[13,14] and physicians often recommend a low-fat diet. However, some high-fat foods may have beneficial effects, such as greater satiety subsequently leading to lower food intake overall.[15,16] Studies have demonstrated that consuming higher-calorie fatty foods and higher-fat diets may produce and sustain as much or more weight loss than lower-fat diets.[17-20]

Some dietary guidelines specifically recommend replacing saturated fats with unsaturated fats to improve vascular health. The rationale is that consuming saturated fats raises levels of total and low-density lipoprotein cholesterol, whereas consuming unsaturated fats generally lowers these levels.[21] Regardless of potential changes in disease-oriented lipid parameters, evidence is mounting that saturated fats may not be a primary driver of cardiometabolic disease or mortality.[22-28] A Cochrane review found no effects on cardiovascular or all-cause mortality with reduction of saturated fat or with substituting other fats for saturated fat. Although there was the suggestion of a small reduction in cardiovascular events in trials with dietary fat modification (maintaining total fat intake but with higher proportions of polyunsaturated and monounsaturated fats), effects became statistically nonsignificant when the review authors excluded biased studies (i.e., those having systematic differences between intervention and control groups, other than dietary-fat differences).[29]

It is important to note that patients do not eat isolated types of fat; they eat foods that contain mixes of fats, as well as other components such as proteins, carbohydrates, micronutrients, and fiber. Some foods containing saturated fats may be harmful, whereas others may

be benign or even beneficial. For instance, consuming ultraprocessed foods high in saturated fats (e.g., preserved meats) has been associated with significant increases in cardiovascular and all-cause mortality,[26] whereas consuming whole foods high in saturated fats (e.g., dairy products) has been inversely associated with incident cardiovascular disease[27] and cardiometabolic risk factors such as type 2 diabetes mellitus and obesity.[22,28] Reducing saturated fat in the diet may not lead to lower cardiovascular risk, especially if what replaces this fat is ultraprocessed (refined) carbohydrates.[30]

ALL TYPES OF FIBER ARE BENEFICIAL

Fiber, a nondigestible food constituent, is not known to be essential for body growth and maintenance, but may be important for general health. The Institute of Medicine recommends a daily fiber intake of 25 g for adult women and 38 g for adult men.[31] Not all kinds of fiber are equally beneficial, however.

Dietary fibers are a natural part of whole plant foods (e.g., fruits, vegetables, nuts, grains, seeds). Dietary fibers have soluble and insoluble forms, both of which may be beneficial. Increased intake of dietary fiber may help prevent cardiovascular disease, diabetes, constipation, and gastrointestinal and breast cancers.[32-37]

By contrast, functional fibers are components of ultraprocessed foods. Functional fibers include polydextrose, inulin, resistant starch, chitosan, and indigestible dextrins. These substances are isolated or created in laboratories and then injected into ultraprocessed food items to increase their fiber content.[31] The U.S. Food and Drug Administration defines any edible product with 2.5 g of fiber per serving as a "good" fiber source[38]; it does not distinguish natural dietary fibers from added functional fibers.

In an effort to meet dietary fiber goals, persons often consume functional fibers in the form of high-fiber ultraprocessed foods. Although evidence is lacking to show that functional fibers are beneficial,[31] there is evidence that consuming functional fibers can lead to gastrointestinal distress and malabsorption of other nutrients.[31] Physicians should steer patients toward whole foods that are naturally high in dietary fiber (e.g., fruits, vegetables, whole grains, nuts), for which there is good evidence of health benefits,[39-41] and away from ultraprocessed products with added functional fibers.[31]

3,500 CALORIES TRANSLATES TO 1 LB OF BODY WEIGHT

Patients who want to lose weight may ask their physicians how many fewer calories they need to eat or how many more they need to burn to lose weight. The prevailing belief is that a net deficit of 3,500 calories (i.e., 3,500 calories burned in excess of calories ingested) will yield a body weight reduction of 1 lb (0.45 kg). This "3,500 calorie rule" is oversimplified and does not take into account the dynamic, nonlinear response of body weight to sustained changes in calorie balance.[42] When individuals lose weight, compensatory mechanisms work to prevent further weight loss and promote regain.[43,44]

The 3,500 calorie rule would predict that an individual underconsuming 100 net calories per day would lose more than 50 lb (22.7 kg) over five years. More accurate weight loss estimates, which take into account dynamic and compensatory changes, would predict a decrease of only about 10 lb.[43] Therefore, relying on the 3,500 calorie assumption may create false expectations for patients and set them up for failure and disappointment.

A better rule of thumb for adults is that a maintained deficit of 100 calories per day without any other changes will lead to an eventual weight loss of about 10 lb; it will take about one year to achieve 50% and about three years to achieve 95% of the total weight loss.[45] Physicians who want to help patients predict weight loss can use the National Institutes of Health's body weight simulator, which is available at http://www.niddk.nih.gov/research-funding/at-niddk/labs-branches/LBM/integrative-physiology-section/body-weight-simulator/Pages/body-weight-simulator.aspx. Recommendations to avoid processed foods and consume whole foods might help patients meet their overall caloric goals.

Healthy Dietary Advice

The selected myths described in this article are characterized by dietary reductionism, which emphasizes food constituents instead of foods in their entirety. Although much nutritional science is based on evaluating the benefits or harms of food constituents such as micronutrients, macronutrients, non-nutrients, and energy, patients eat foods, not food constituents.[46] If patients consume ultraprocessed foods that are altered, for instance, to add calcium and fiber and to remove saturated fat and calories, they will not necessarily be healthier, as the myths discussed in this article suggest.

There have been no long-term head-to-head studies to guide clinicians in recommending specific whole foods over others to patients. However, various diets (e.g., low-carbohydrate, low-fat, low-glycemic, Mediterranean, mixed/balanced, Paleolithic) have been shown to improve weight; surrogate end points; or chronic disease incidence, prevalence, or severity in various trials and cohort studies.[1,47,48] None of these diet plans have been shown to be superior to the others, and they all share common features and a consistent theme: limit

Table 1. Examples of Ultraprocessed Foods and Whole Food Alternatives

*Ultraprocessed foods**	*Selected reductionist concerns*	*Whole food alternatives†*
Candies, cookies, and other confections (even low-fat, low-calorie versions)	Refined sugars, unhealthy fats, few vitamins and minerals, little fiber	Fresh or dried unsweetened whole fruits
Chips, pretzels, and other refined snacks, even if low fat	Refined carbohydrates, few vitamins and minerals, little fiber	Nuts and seeds
Cold cuts, hot dogs, other preserved meats; vegetarian "meats" or products made from isolated vegetable protein	Saturated fats, high calorie density, and/or refined carbohydrate fillers	Whole soy (e.g., tofu, tempeh), beans, wild-caught fish, pastured meats or eggs, or wild game
White breads and refined bakery products (with or without added supplemental constituents such as fiber or calcium)	Refined carbohydrates, few vitamins and minerals, little fiber	100% whole-grain or sprouted/flourless breads and bakery products
White rice	Refined carbohydrates, few vitamins and minerals, little fiber	Brown rice

NOTE: *The theme for healthy eating focuses on foods, not food constituents: limit ultraprocessed foods and eat more whole foods (or minimally processed foods), generally in a form that is as close to what occurs in nature as possible (e.g., organic plants and wild-caught or pastured animals raised on their natural diets). The healthiest food comes from farms, not factories or factory farms.*

**—Highly altered foods from industrial processing plants, with various components removed and/or added (including colors, flavors, conditioners, stabilizers, and preservatives beyond the scope of this article).*

†*—Minimally manipulated foods from living botanical plants (or, based on individual preferences, the animals that eat them) with limited removal or addition of components.*

ultraprocessed foods and eat whole foods (or minimally processed foods), generally in a form that is as close to what occurs in nature as possible.[1] Within this theme for healthy eating, there is room for variation, such as the inclusion or exclusion of meats, other animal products, or certain grains.

Although many believe that whole or minimally processed foods are expensive, studies have shown that healthy whole foods can be cheaper than ultraprocessed foods.[49-51] *Table 1* provides examples of ultraprocessed foods and whole food alternatives. Family physicians can help their patients achieve healthy dietary changes using the simple advice to eat more whole foods and avoid ultraprocessed foods, advice highly consistent with the 2015 Dietary Guidelines Advisory Committee recommendations.[52]

Data Sources: We searched Dynamed, the Cochrane database, Essential Evidence Plus, and the U.S. Preventive Services Task Force website using various search terms including calcium, fiber, dietary prevention, obesity, and weight loss. We searched PubMed using Clinical Queries and the search terms milk, dairy, calcium, osteoporosis, dietary fat, obesity, saturated fats, cardiovascular disease, fiber, and functional fiber. Searches prioritized systematic reviews. We also searched PubMed using the same terms outside of Clinical Queries, but using filters to focus on only meta-analyses and reviews. Search date: August 28, 2014.

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