



COMMON DIETS: NUTRITION, AND OBESITY

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Scientific data suggest positive relationships between a vegetarian diet and reduced risk for several chronic degenerative diseases and conditions, including obesity, coronary artery disease, hypertension, diabetes mellitus, and some types of cancer. Vegetarian diets, like all diets, need to be planned appropriately to be nutritionally adequate.

Position statement

It is the position of The American Dietetic Association (ADA) that appropriately planned vegetarian diets are healthful, are nutritionally adequate, and provide health benefits in the prevention and treatment of certain diseases.

Vegetarianism in Perspective

The eating patterns of vegetarians vary considerably. The lacto-ovo-vegetarian eating pattern is based on grains, vegetables, fruits, legumes, seeds, nuts, dairy products, and eggs, and excludes meat, fish, and fowl. The vegan, or total vegetarian, eating pattern is similar to the lacto-ovo-vegetarian pattern except for the additional exclusion of eggs, dairy, and other animal products. Even within these patterns, considerable variation may exist in the extent to which animal products are avoided. Therefore, individual assessment is required to accurately evaluate the nutritional quality of a vegetarian's dietary intake.

In addition to the health advantages, other considerations that may lead a person to adopt a vegetarian diet pattern include concern for the environment, ecology, and world hunger issues. Vegetarians also cite economic reasons, ethical considerations, and religious beliefs as their reasons for following this type of diet pattern. Consumer demand for vegetarian options has resulted in increasing numbers of foodservices that offer vegetarian options. Presently, most university foodservices offer vegetarian options.

Health Implications of Vegetarianism

Vegetarian diets low in fat or saturated fat have been used successfully as part of comprehensive health programs to reverse severe coronary artery disease (3,4). Vegetarian diets offer disease protection benefits because of their lower saturated fat, cholesterol, and animal protein content and often higher concentration of folate (which reduces serum homocysteine levels) (5), antioxidants such as vitamins C and E, carotenoids, and phytochemicals (6). Not only is mortality from coronary artery disease lower in vegetarians than in non-vegetarians (7), but vegetarian diets have also been successful in arresting coronary artery disease (8,9). Total serum cholesterol and low-density lipoprotein cholesterol levels are usually lower in vegetarians, but high-density lipoprotein cholesterol and triglyceride levels vary depending on the type of vegetarian diet followed (10).

Vegetarians tend to have a lower incidence of hypertension than non-vegetarians (11). This effect appears to be independent of both body weight and sodium intake. Type 2 diabetes mellitus is much less likely to be a cause of death in vegetarians than non-vegetarians, perhaps because of their higher intake of complex carbohydrates and lower body mass index (12).

Incidence of lung and colorectal cancer is lower in vegetarians than in non-vegetarians (2,13). Reduced colorectal cancer risk is associated with increased consumption of fibre, vegetables, and fruit (14,15). The environment of the colon differs notably in vegetarians compared with non-vegetarians in ways that could favourably affect colon cancer risk (16,17). Lower breast cancer rates have not been observed in Western vegetarians, but cross-cultural data indicate that breast cancer rates are lower in populations that consume plant-based diets (18). The lower estrogen levels in vegetarian women may be protective (19).



A well-planned vegetarian diet may be useful in the prevention and treatment of renal disease. Studies using human being and animal models suggest that some plant proteins may increase survival rates and decrease proteinuria, glomerular filtration rate, renal blood flow, and histologic renal damage compared with a non-vegetarian diet (20,21).

Nutrition Considerations for Vegetarians

Plant sources of protein alone can provide adequate amounts of essential amino acids if a variety of plant foods are consumed and energy needs are met. Research suggests that complementary proteins do not need to be consumed at the same time and that consumption of various sources of amino acids over the course of the day should ensure adequate nitrogen retention and use in healthy persons (22). Although vegetarian diets are lower in total protein and a vegetarian's protein needs may be somewhat elevated because of the lower quality of some plant proteins, protein intake in both lacto-ovo-vegetarians and vegans appears to be adequate (16).

Plant foods contain only nonheme iron, which is more sensitive than heme iron to both inhibitors and enhancers of iron absorption. Although vegetarian diets are higher in total iron content than non-vegetarian diets, iron stores are lower in vegetarians because the iron from plant foods is more poorly absorbed (23). The clinical importance of this, if any, is unclear because iron deficiency anemia rates are similar in vegetarians and non-vegetarians (23). The higher vitamin C content of vegetarian diets may improve iron absorption.

Although plant foods can contain vitamin B-12 on their surface from soil residues, this is not a reliable source of B-12 for vegetarians. Much of the vitamin B-12 present in spirulina, sea vegetables, tempeh, and miso has been shown to be inactive B-12 analog rather than the active vitamin. Although dairy products and eggs contain vitamin B-12, research suggests that lacto-ovo-vegetarians have low blood levels of vitamin B-12. Supplementation or use of fortified foods is advised for vegetarians who avoid or limit animal foods (24).

Because vitamin B-12 requirements are small, and it is both stored and recycled in the body, symptoms of deficiency may be delayed for years. Absorption of vitamin B-12 becomes less efficient as the body ages, so supplements may be advised for all older vegetarians.

Lacto-ovo-vegetarians have calcium intakes that are comparable to or higher than those of non-vegetarians (25,26). Calcium intakes of vegans, however, are generally lower than those of both lacto-ovo-vegetarians and omnivores (26). It should be noted that vegans may have lower calcium needs than non-vegetarians because diets that are low in total protein and more alkaline have been shown to have a calcium-sparing effect (27). Furthermore, when a person's diet is low in both protein and sodium and regular weight-bearing physical activity is engaged in, his or her calcium requirements may be lower than those of a sedentary person who eats a standard Western diet. These factors, and genetic influences, may help explain variations in bone health that are independent of calcium intake.

Because calcium requirements of vegans have not been established and inadequate calcium intakes are linked to risk for osteoporosis in all women, vegans should meet the calcium requirements established for their age group by the Institute of Medicine (28). Calcium is well absorbed from many plant foods, and vegan diets can provide adequate calcium if the diet regularly includes foods rich in calcium (29). In addition, many new vegetarian foods are calcium-fortified. Dietary supplements are advised for vegans only if they do not meet calcium requirements from food.

Diets that do not include fish or eggs lack the long-chain n-3 fatty acid docosahexanoic acid (DHA). Vegetarians may have lower blood lipid levels of this fatty acid, although not all studies are in agreement with this finding (34,35). The essential fatty acid linolenic acid can be converted to DHA, although conversion rates appear to be inefficient and high intakes of linolenic acid interfere with conversion (36). The implications of low levels of DHA is not clear. However, it is recommended that vegetarians include good sources of linolenic acid in their diet.



Figure 1 below presents food sources of nutrients that are often of concern for vegetarians.

<u>Iron</u>	<u>Milligrams per serving</u>	<u>Calcium</u>	<u>Milligrams per serving</u>
Breads, cereals, and grains		Legumes (1 c cooked)	
Whole wheat bread, 1 slice	0.9	Chickpeas	78
White bread, 1 slice	0.7	Great northern beans	121
Bran flakes, 1 c	11.0	Navy beans	128
Cream of wheat, 1/2 c cooked	5.5	Pinto beans	82
Oatmeal, instant, 1 packet	6.3	Black beans	103
Wheat germ, 2 Tbsp	1.2	Vegetarian baked beans	128
Vegetables (1/2 c cooked)		Soyfoods	
Beet greens	1.4	Soybeans, 1 c cooked	175
Sea vegetables	18.1-42.0	Tofu, 1/2 c	120-350
Swiss chard	1.9	Tempeh, 1/2 c	77
Tomato juice, 1 c	1.3	Textured vegetable protein, 1/2 c	85
Turnip greens	1.5	Soymilk, 1 c	84
Legumes (1/2 c cooked)		Soymilk, fortified, 1 c	250-300
Baked beans, vegetarian	0.74	Soynuts, 1/2 c	252
Black beans	1.8	Nuts and seeds (2 Tbsp)	
Garbanzo beans	3.4	Almonds	50
Kidney beans	1.5	Almond butter	86
Lentils	3.2	Vegetables (1/2 c cooked)	
Lima beans	2.2	Bok choy	79
Navy beans	2.5	Broccoli	89
Soyfoods (1/2 c cooked)		Collard greens	178
Soybeans	4.4	Kale	90
Tempeh	1.8	Mustard greens	75
Tofu	6.6	Turnip greens	125
Soymilk, 1 c	1.8	Fruits	
Nuts/seeds (2 Tbsp)		Dried figs, 5	258
Cashews	1.0	Calcium-fortified orange juice, 1 c	300

FIG 1. Food sources of nutrients. Sources: Package information and data from: Pennington J. Bowe's and Church's Food Values of Portions Commonly Used. 16th ed. Lippincott-Raven; 1994. Provisional Table on the Content of Omega-3 Fatty Acids and Other Fat Components in Selected Foods, 1988. Ibadan Oyo State: Nafdac Dept of^aRed Star Yeast and Products, a division of Universal Foods Corp, Ikeja, Lagos.

Conclusions

Diets that are high in carbohydrate and low to moderate in fat tend to be lower in energy. The lowest energy intakes were observed for those on a vegetarian diet. The diet quality as measured by HEI was highest for the high carbohydrate groups and lowest for the low carbohydrate groups. The BMIs were significantly lower for men and women on the high carbohydrate diet; the highest BMIs were noted for those on a low carbohydrate diet.



References

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