

This issue's topic

ADOLESCENT VEGETARIANISM

INTRODUCTION

Vegetarians often adopt their eating behaviors for religious, cultural, or personal reasons. Oftentimes, vegetarianism is glamorized or oversimplified, leading many adolescents to believe that vegetarianism is a fashionable diet that is easy to adopt. Although a vegetarian diet can be nutritionally adequate, vegetarianism promotes a restricted eating pattern that requires a great deal of guidance and awareness. This fact sheet is intended to help educators and counselors better understand — and thereby more accurately communicate to students — the issues that need to be considered when an adolescent chooses to adopt a vegetarian diet.

Types And Extent Of Vegetarianism

One of the problems common to discussions of vegetarianism is the failure to recognize that there are many types of vegetarian diets, and that each type may pose different risks. Adolescents who adopt a vegetarian diet — and those who provide guidance — need to understand what kind of “vegetarian” diet is being adopted. In general, a “vegetarian” diet consists of plant sources of food — grains, legumes, nuts, vegetables, and fruits — and excludes all or certain animal foods. Nutrition professionals identify four categories of vegetarian diets (1):

- **Strict vegetarian (vegan):** follows an eating plan with no animal products.
- **Lacto-vegetarian:** eats dairy products but not meat, poultry, fish, or eggs.
- **Lacto-ovo-vegetarian:** eats dairy products and eggs, but not meat, poultry, or fish.
- **Semi-vegetarian:** mostly follows a vegetarian eating pattern but occasionally eats meat, poultry, or fish.

Other variations of vegetarian diets include “pesco” (eats fish but not meat or poultry), “pollo” (eats poultry but not meat or fish), or “pesco-pollo” (eats fish and poultry but not red meat).

Not surprisingly, the numerous versions of “vegetarian” diets has lead to confusion about the incidence of vegetarianism. For example, according to a recent Time/CNN/Harris Interactive Poll of 10,000

adults, 4% of respondents consider themselves to be practicing vegetarians. Yet when asked which type of vegetarianism best described them, 2.3% said semi-vegetarian, 1.4% said lacto-ovo-vegetarian, and only 0.2% responded vegan (2). These results suggest that few Americans actually adopt true vegetarian diets.

Healthfulness Of Vegetarian Diets

Although vegetarian diets can be nutritionally adequate and associated with good health, research does not show a conclusive cause-and-effect relation between consumption of a vegetarian diet and specific health benefits. Self-described vegetarians tend to be more health-conscious than the general population; therefore, population-based studies that compare vegetarians with the general population may mistakenly attribute health benefits to vegetarian eating patterns when in fact the health benefits may be caused by lifestyle factors other than diet, such as low incidence of smoking, low consumption of alcohol, or regular exercise (3). In fact, a recent study comparing the mortality of British vegetarians and non-vegetarians found similar death rates among both groups, after accounting for non-dietary lifestyle factors, such as low prevalence of smoking and a generally high socio-economic status, or to aspects of the diet other than the avoidance of meat and fish (4).

Another study comparing vegetarians and non-vegetarians found both groups met current nutrition recommendations for macronutrients and concluded that relative body weight, weight loss efforts, and dietary quality do not differ greatly between similarly health conscious vegetarians and non-vegetarians (5). The only differences in nutrient intake with potential health implications were that vegetarians had intakes of Vitamin D and B₁₂ well below recommendations (5).

Nutrition Risks Of Vegetarian Diets

Adopting a vegetarian diet does not necessarily ensure a healthful eating style. In fact, vegetarian diets are often associated with two types of nutrition risks: nutritional deficiencies and disordered eating.

Leading health organizations acknowledge that while appropriately-planned vegetarian diets can be healthful and nutritionally adequate, poorly-planned vegetarian diets may fall short of requirements for nutrients such as vitamin B₁₂, calcium, vitamin D, riboflavin, protein, iron, zinc, n-3 fatty acids and perhaps other trace elements (6,7). Studies of female adolescents have shown that lacto-ovo-vegetarians, semi-vegetarians, and vegans are more at risk for nutrient inadequacies than their omnivorous counterparts (5,8).



By eliminating a major source of nutrients from the diet, an adolescent vegetarian adopts what is called a “restrictive diet,” which requires even more careful planning than a normal diet. The U.S. government’s *Dietary Guidelines for Americans* report points out that meat, fish, and poultry are major contributors of iron, zinc, and B vitamins in most American diets, and recommends that people choosing to avoid all or most animal products get enough iron, vitamin B₁₂, calcium, and zinc from other sources (9). Because animal products are the only food sources of vitamin B₁₂, vegans must supplement their diets with a source of this vitamin. In addition, vegan diets require care to ensure adequacy of vitamin D (10).

A study of vegetarian adolescents in a multiethnic urban population found this group was more likely than non-vegetarians to be weight and body-conscious, dissatisfied with their bodies, and involved in a variety of healthy and unhealthy weight control behaviors. Vegetarians more often reported having been told by a physician that they had an eating disorder. Researchers concluded that adolescent vegetarians are at greater risk than others for involvement in unhealthy and extreme weight control behaviors (11). A recent study by Klopp et al. found similar results when studying vegetarian and non-vegetarian college women (12). In a position paper on vegetarianism, the American

Dietetic Association alerts dietetic professionals to the possibility that the choice of a vegetarian diet by an adolescent may be a camouflage of an eating disorder (6).

Adolescent vegetarians need to plan their diets carefully and monitor their intakes of certain kinds of food to be sure they are consuming adequate amounts of nutrients, such as iron, zinc, vitamin B₁₂, and protein.

• **Iron**

Iron deficiency is a potentially serious problem among young children, females, members of low-income families, pregnant women, vegetarians, and athletes. Iron requirements are heightened during adolescence because of accelerated growth, rapid increase in blood volume and muscle mass, the onset of menstruation (and hence iron loss) in girls, and the adoption of slimming diets (more commonly in girls) or poor eating habits leading to low iron intake (13).

Although adolescents, particularly young women, are among the groups most in need of iron, they also are among the groups most likely to consume inadequate amounts of iron. Data from the U.S. Department of Agriculture’s 1994-1996 Continuing Survey of Food Intakes by Individuals shows that only 40% of girls 12-19 years of age and only 16% of women 20-29 years of age meet 100% of the current RDA for iron (14).

Many foods in the diet contain iron, but absorption factors depend on the type of iron. Iron is available in the diet in two forms, heme and nonheme iron. Red meat, poultry, and fish contain heme iron, which is much more easily absorbed by the body than nonheme iron, found mainly in plant foods. Of all the meats, beef contains the most heme iron. Also, absorption of nonheme iron increases two- to four-fold when red meat, poultry, or fish is eaten in the same meal. This enhancing effect is sometimes referred to as the “meat factor.” For example, when meat and vegetables are eaten together, more iron from the vegetables is absorbed than if the vegetables are eaten alone (15).

The concepts of “heme iron v. nonheme iron” and the “meat factor” help explain the research finding that vegetarians tend to have lower iron stores than non-vegetarians even when vegetarian diets contain higher total iron content (16). One study of premenopausal women found that those eating a meat-containing, non-vegetarian diet absorbed six times more iron than those eating a lacto-ovo-vegetarian diet that provided a similar amount of iron, but no meat (17).

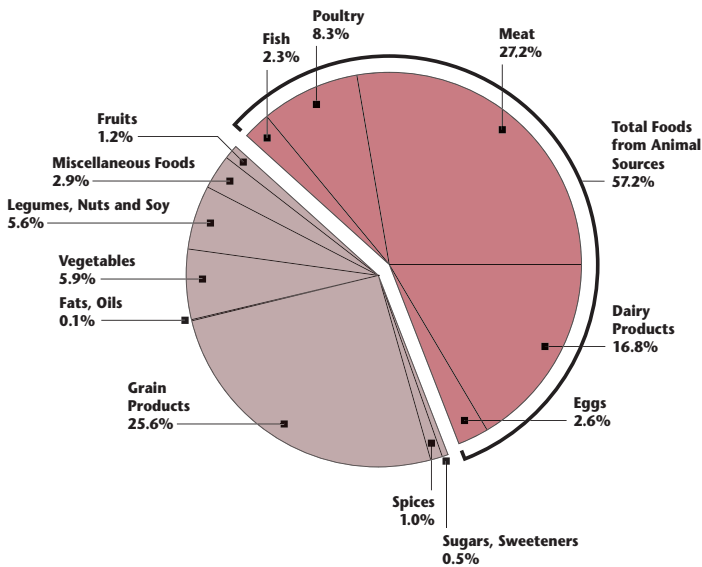
And a recent study of adolescents found those who were instructed to eat lean poultry or fish, but not lean beef, as part of a diet low in saturated fat, had significantly lower levels of serum ferritin compared to those who did include lean beef, even though both groups had similar iron intakes and met the Dietary Reference Intake (DRI) for their age and sex during the study (18).

IRON CONTENT OF FOODS (19)

| Food | Total Iron (mg) |
|---|-----------------|
| HEME Iron Sources | |
| Beef liver, pan fried (3 oz.) | 5.2 |
| Oysters, 6 medium raw | 4.8 |
| Sirloin, broiled (3 oz.) | 2.9 |
| Ground beef, extra lean, broiled, well done (3 oz.) | 2.2 |
| Pork tenderloin, roasted (3 oz.) | 1.3 |
| Tuna fish, light meat, canned (3 oz.) | 1.3 |
| Turkey breast, roasted (3 oz.) | 1.1 |
| Chicken breast, roasted (3 oz.) | .89 |
| Veal cutlet, pan fried (3 oz.) | .74 |
| Non-HEME Iron Sources | |
| Raisin bran, dry, (1 cup) | 4.6 |
| Kidney beans, boiled, (1/2 cup) | 2.6 |
| Bagel, enriched (one half) | 1.2 |
| Egg, large, hard-boiled | .59 |
| Spinach, raw (1/2 cup) | .41 |
| Apple, 1 medium | .17 |
| Milk, 1% (1 cup) | .07 |



PERCENT CONTRIBUTION OF ZINC BY DIETARY SOURCE IN THE UNITED STATES (24)



Due to the many factors affecting iron absorption, the Food and Nutrition Board recommends iron intakes for vegetarians should be adjusted upwards by a factor of 80% compared with that of non-vegetarians because of lower bioavailability of iron from a vegetarian diet (20).

• Zinc

Physiological processes such as growth increase the need for zinc. For this reason, young children, adolescents, and pregnant women may be at greater risk for the development of zinc deficiency. Zinc is recognized to be essential not only for growth and development, but also for a wide range of clinical, biochemical and immunological functions in the body. It is required for the activity of several hundred enzymes involved in most major metabolic pathways in the human body (20).

The composition of the diet has important effects on zinc absorption. Beef, for example, not only is an excellent source of zinc, but zinc from beef is readily available. Including beef in the diet also improves the absorption of zinc from other foods (21). A study of healthy adults demonstrated that the absorption of zinc from beef is about four times greater than that from a high-fiber breakfast cereal (22). Less zinc may be absorbed from a vegetarian diet compared with an omnivorous diet because of the lower zinc content of meatless diets and a lower bioavailability of zinc in plant foods (23).

Because of the low bioavailability of zinc in many plant foods, vegetarian diets may have an adverse effect on zinc status. To meet their needs, vegetarians may require as much as 50% more zinc than non-vegetarians (20).

• Vitamin B₁₂

Vitamin B₁₂ deficiency can have serious consequences. It can cause severe anemia and irreversible damage to the nervous system. One study of adolescents suggests that B₁₂ deficiency may lead to impaired cognitive performance (25). The authors of a recent study comparing Vitamin B₁₂ status in vegans, lacto-vegetarians, lacto-ovo-vegetarians and omnivores conclude that certain risk factors for heart disease may be elevated in vegetarians (26).

Vitamin B₁₂ is normally found only in foods of animal origin. For strict vegetarians, vitamin B₁₂ is a nutrition concern (1). Even adolescent vegetarians who consume eggs and dairy products should take precautions to prevent vitamin B₁₂ deficiency. Supplementation or use of fortified foods is advised for vegetarians who avoid or limit animal foods. Because vitamin B₁₂ requirements are small, and it is both stored and recycled in the body, symptoms of deficiency may be delayed for years.

• Protein

A carefully planned vegetarian diet, particularly one that includes eggs and dairy products, usually can provide adequate protein, provided the overall diet includes different types of plant foods and the total amount of food is sufficient to meet energy needs. Adolescent

vegetarians — particularly strict vegetarians — need to be aware that their protein needs may be somewhat elevated because of the lower quality of some plant proteins, such as cereals and legumes (6). Beef is considered to have a “high biological value” in terms of protein because it contains all nine of the essential amino acids the human body needs (27).

CURRENT RESEARCH TOPICS

Iron, Zinc, B Vitamins And Cognition

The link between iron, zinc, and cognition is well established — deficiencies impair mental performance throughout the lifecycle. Deficits are also linked to growth retardation, neuro-sensory changes (abnormal dark adaptation and alteration in taste acuity), delayed wound healing, and decreased immune functions. Recent research suggests that even mild, short-term deficiencies may impair mental acuity by decreasing attention span, learning ability, short-term memory, and problem-solving skills (28-34). Beef provides higher percentages of readily absorbed iron and zinc than any other single food. (35).

Recent research has also established the link between B vitamin (particularly Vitamins B₆, B₁₂ and folate) deficiencies and impaired cognitive performance in the general population, especially in the elderly (36).





Recommendations For Managing Vegetarian Diets

If adolescents understand the principles of vegetarian meal planning and practice these principles sensibly, they probably will not encounter major nutrition-related health problems. In reality, however, adolescent vegetarians usually lack sufficient knowledge of nutrition and vegetarian meal planning. They may also have little motivation to learn how to practice vegetarianism in a healthful way.

General educational efforts are needed to teach adolescents how to eat more healthfully and how to contend with fad diets and nutrition misinformation (37). Vegetarian adolescents need counseling to ensure energy and nutrient needs are met for increased growth demands (38). The eating patterns of vegetarians vary considerably. Therefore, individual assessment is required to accurately evaluate the nutritional quality of an adolescent's vegetarian dietary intake (6).

Parents, educators, and other adult influencers can ensure that discussions of vegetarianism take place in a rational, scientific atmosphere where adolescents can learn to think clearly about the consequences of critical life decisions, such as lifelong eating patterns.

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