Symposium: Sugar and Fat—From Genes to Culture

Strategies for Intervention: Commentary and Debate

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ABSTRACT The typical American diet is top-heavy in comparison with the Food Guide Pyramid—high in added sugars and fats at the Pyramid’s tip, and low in most other food components at the Pyramid’s base, especially fruit and green leafy vegetables. Improving the healthfulness of the diet would therefore require not only a major reduction in the consumption of fats and sweets but also a sharp increase in the consumption of vegetables and fruit. This report discusses the potential effects on diet quality of three general dietary strategies for obesity prevention and treatment: (a) reducing the fat content of foods, (b) increasing nutrition knowledge and (c) manipulating food prices. It concludes that improving food choices may require a combination of strategies and interventions carefully targeted at changing specific behaviors among diverse population groups.


KEY WORDS: food tax • food subsidy • nutrition education • healthy diets • food prices • new food products • improving diets

The typical American diet is top-heavy in comparison with the Food Guide Pyramid—high in added sugars and fats at the Pyramid’s tip, and low in most other food components at the Pyramid’s base, especially fruit and green leafy vegetables (1) (Fig. 1). Improving the healthfulness of the diet would therefore require not only a major reduction in the consumption of fats and sweets but also a sharp increase in the consumption of vegetables and fruit.

Over the past 3 decades, per capita consumption of fruits and vegetables in the U.S. food supply has increased, but so has per capita consumption of sugars and fats (2). Food supply data show a 20% increase in per capita consumption of fruits and vegetables between 1970 and 2000, compared with a 42% increase in added fats and a 162% increase in the consumption of cheese. Consumption of caloric sweeteners increased 23%, from an average of 42 teaspoons per person per day to an average of 52 teaspoons per person per day, whereas consumption of caloric soft drinks increased 70%, from 7.8 oz per person per day to 13.2 oz per person per day.

Alarm over increased consumption of sugars and fats has led to speculation that the consumption of soft drinks and fast foods may in part explain the observed sharp rise in the prevalence of obesity in this country (3). It has also led to considerable debate on how to reverse this trend. Although no individual food or eating occasion can be blamed for the current obesity problems, this report discusses the potential effects on diet quality of three general dietary strategies for obesity prevention and treatment: (a) reducing the fat content of foods, (b) increasing nutrition knowledge and (c) manipulating food prices.

Reducing the fat content of foods

The 1988 Surgeon General’s Report on Nutrition and Health concluded that “the public would benefit from increased availability of foods and food products low in calories, total fat, [etc.]”, and challenged the food industry to “contribute to improving the quality of the American diet by increasing the availability of palatable, easily prepared food products that will help people follow the dietary principles outlined [in the report]” (4). The food industry responded by reformulating foods to improve their nutritional content—in particular, by reducing the fat content of foods. In the early- to mid-1990s, hundreds of new lower fat foods were introduced. Between 1989 and 1993, sales of low fat versions of many foods grew at a greater rate than their traditional counterparts, even though some of the low fat items charged a price premium (5). However, by 1997 the number of new food products bearing a lower fat claim plummeted. Food manufacturers claimed that consumers had become dissatisfied with the taste of many of the lower fat foods, particularly the nonfat versions (6). The increased number of new food product introduced in 2000 may indicate that the market for reduced-fat foods is rebounding, or it may reflect the manufacturers’ decision to partly restore the fat content of their once nonfat foods (7).

Analysis of purchase data for microwave popcorn, based on 1995–1999 supermarket scanner data, supports a trend away from increased availability of palatable, easily prepared food products that will help people follow the dietary principles outlined [in the report]” (4). The food industry responded by reformulating foods to improve their nutritional content—in particular, by reducing the fat content of foods. In the early- to mid-1990s, hundreds of new lower fat foods were introduced. Between 1989 and 1993, sales of low fat versions of many foods grew at a greater rate than their traditional counterparts, even though some of the low fat items charged a price premium (5). However, by 1997 the number of new food products bearing a lower fat claim plummeted. Food manufacturers claimed that consumers had become dissatisfied with the taste of many of the lower fat foods, particularly the nonfat versions (6). The increased number of new food product introduced in 2000 may indicate that the market for reduced-fat foods is rebounding, or it may reflect the manufacturers’ decision to partly restore the fat content of their once nonfat foods (7).

Analysis of purchase data for microwave popcorn, based on 1995–1999 supermarket scanner data, supports a trend away from lower fat versions. Although overall consumption of microwave popcorn increased between 1995 and 1999, the driving force behind the increase in consumption was not the

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consumption of lower fat versions but the increased consumption of the “regular,” high fat versions (8).

Similarly, the fast-food restaurants’ attempts to offer lower fat menu alternatives have met with mixed success. The McDonald’s McLean hamburger—a lower fat alternative in which some of the beef fat was replaced with agar derivatives, vegetable proteins and water—was taken off the market (3). On the other hand, more recent introductions by fast-food restaurants, such as Wendy’s Garden Sensations salads, and the McDonald’s Grilled Chicken Flatbread, appear to be meeting with greater consumer acceptance (9).

Despite expectations, increased availability of lower fat products has not translated into improvements in diet quality. To the contrary, the availability of added fats in the food supply grew throughout the 1990s, the time period when the food industry introduced large numbers of lower fat products (2). It may be that consumers substituted some high fat foods for other foods, and food substitutions do not always work in favor of good nutrition. For example, reduced consumption of whole milk was offset by increased consumption of (high fat) milks, such as fat-free and 1% milk (10). Many consumers who focused on reducing fat intake lost sight of the importance of total calories in maintaining weight or the importance of consuming more fruits and vegetables. Although improving the nutritional content of specific foods may allow consumers to make easy changes in eating habits, such as switching from whole milk to lower fat milks, such improvements do not necessarily translate into better-quality diets overall (3).

Increasing nutrition knowledge

Awareness of diet–disease relationships, favorable attitudes about healthy eating and better knowledge of the nutrient content of foods are all said to result in healthier food choices. U.S. Department of Agriculture studies have shown that nutrition knowledge has a measurable impact on nutrient intake and diet quality for consuming individuals, as well as for other members of the household (11). Given that nutrition knowledge in the United States is relatively high, the question remains of why are people not eating more healthfully.

For some consumers, this may be due to misperceptions about the nutritional content of the foods consumed or the overall quality of the diet. Even trained dietitians have difficulties estimating the nutritional content of foods (11). Given the increasing trend toward the consumption of foods prepared away from home (12), it is easy to imagine how much more difficult it would be for ordinary consumers to correctly assess the nutritional quality of their diets. In fact, nearly half of persons with high cholesterol intakes mistakenly assessed their intake to be “about right” (13). Among respondents who believed their diet needed no improvement, quality score (as measured with the Healthy Eating Index) averaged 59.2, at the bottom of the 51–80 “needs improvement” range (14).

For some consumers, unhealthful diets may result from their valuing other food attributes—such as taste, convenience, familiarity and price—more highly than nutrition. Even when nutrition knowledge is high, consumers may choose immediate gratification in their food choices over uncertain long-term returns, perhaps because there is no guarantee that a lifetime of healthy eating will result in less illness or longer life. In addition, the possibility that medical advances or the discovery of a “silver bullet” may take care of the problem in the future can lessen the incentive to change eating habits as a preventive strategy.

Interventions aimed at improving consumers’ nutrition knowledge must consider the reasons behind food choices. For example, individuals who believe their diets are healthful may see no reason to change their eating habits. Targeting this group with nutrition education efforts tailored toward correcting their misperceptions about diet quality may be more effective than providing them with information about diet–disease relationships.

Increasing levels of nutrition knowledge may be a particularly effective strategy for changing consumption patterns among the elderly. As people age, the benefits of healthy eating may become more apparent and tangible, and they may care more about eating more healthful diets. Age-associated decline in bitter-taste sensitivity has been associated with higher reported preferences for vegetables, many of them bitter. In general, the elderly consume more vegetables and fruit than do younger persons and are most likely to conform to the 5-A-Day for Better Health guidelines. A recent analysis of the diet quality of the elderly showed that a greater proportion of individuals aged =65 y had a “good” diet relative to persons aged 45–64 y, although it is not clear how much of this difference may be a cohort effect (15).

Do healthy diets cost more?

Concerns about the higher cost of healthy diets typically revolve around the perceived higher cost of fruits and vegetables and nutritionally improved foods. The energy cost ($/MJ) of fresh produce is substantially more than the energy cost of added sugars and fat. However, improving the healthfulness of the diet often requires reducing the consumption of high fat/high sugar foods while increasing consumption of fruits and vegetables. Therefore, the food costs associated with a healthier diet would depend on the difference in price between the fruits and vegetables that are being added and the foods that are being replaced in the diet.

A short visit to a supermarket provides illustrative prices for a sample of fruits, vegetables and high sugar/high fat foods that might be ideal candidates for replacement. Because these foods are substituting for one another, all prices were converted into a “per-serving” basis, where a serving represents the amount people might normally eat at a sitting. For packaged foods, the serving size on the nutrition label was used; for fresh produce, either a “unit” serving size (e.g., a banana, or an apple) or a half-cup amount was used. Based on these estimated “per-
serving” prices, eating a half-cup of baby carrots or a banana instead of three Oreo cookies would reduce food cost by $0.03-$0.08 or that eating an orange instead of a small package of M&Ms would reduce food cost by $0.15 (Fig. 2). Although the data are only illustrative, they suggest that a healthier diet need not cost more.

That a diet that meets all of the nutritional recommendations need not cost much can be illustrated by the Thrifty Food Plan, a low cost food plan developed by the U.S. Department of Agriculture that meets current nutritional standards (including Food Guide Pyramid servings recommendations) and can therefore be considered a “healthy” diet (16). Compared with the average diet in 1989–1991, the Thrifty Food Plan included more grains, vegetables, fruit and dairy and less fats, oils and meats (Fig. 3). In February 2002, the Thrifty Food Plan cost an estimated $107/wk for a family of four (17), or approximately $3.80 per person per day.

The low diet cost in the Thrifty Food Plan was achieved by limiting the choices of foods allowed within each food group. As a result, some of the diets were quite limited in variety and departed from the usual food patterns. Generally, people do not like monotonous diets; they want choices, variety, convenience and “taste.” Although diets meeting all of the nutritional recommendations can be achieved at low cost, diets that are more convenient and varied and have more taste are likely to cost more. It is a fact of life that nutritional criteria often compete with other factors such as taste, price and convenience in motivating food choices. Unless “healthy” foods also match these other objectives, it becomes difficult to motivate people to eat healthier diets.

**Manipulating food prices**

One strategy for improving diet quality at the population level involves manipulating food prices through taxes or price supports. Small levies or taxes on “junk” foods to discourage their consumption are one much-debated option. However, achieving a specific dietary goal by manipulating relative food prices may be more complicated than it appears. Food consumption patterns differ by income, gender, race and cultural background; therefore a price change may affect different population groups differently. Food is inexpensive in the United States compared with other countries; a change in the price of one food leads consumers to change their purchases and consumption of other foods, with potential effects on the consumption of nontargeted nutrients as well. A study by the Economic Research Service showed that an increase in the price of beef reduced the availability of calories, fat, saturated fat and cholesterol in the food supply, but it also reduced the availability of fiber and calcium, because beef has complements in the grain group, dairy case and the produce bins (18). If soft drinks are taxed, some consumers will respond to the price increase by reducing consumption of soft drinks—but will their new choice of drinks be “healthier”? What innovations will the very creative food industry come up with in response?

One limitation of vending machine studies described in this symposium is that they measured only the change in isolated food choices and for a limited period of time. Yet people typically eat several regular meals and snacks throughout the day and often make tradeoffs in their food choices (19). Therefore changes in isolated food choices may not always translate into changes in overall consumption or diet quality. An evaluation of the school lunch program in the early 1990s showed that some of the nutritional benefits associated with consuming a school lunch did not hold over 24 h (20). It is not clear, in the vending machine studies described earlier, whether behaviors reverted to baseline at the end of the study period.

Consumers make decisions about what to eat based on a number of factors. Although some of these factors, such as age or gender, are fixed, others are susceptible to well-designed interventions. Improving nutrition knowledge has been shown to improve diet quality, albeit in small degrees and among particular individuals. We need a better understanding of how people make food choices, what factors determine the choice of a healthy diet and what intervention strategies may be most useful and most productive. Improving food choices may require a combination of strategies and interventions carefully targeted at changing specific behaviors among diverse population groups.

**LITERATURE CITED**