

Students' Willingness to Purchase Vegan Menu Items in the National School Lunch Program

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ABSTRACT

Offering plant-based options in school lunches may help schools meet U.S. Department of Agriculture nutrient standards by providing students with options that are low in fat and cholesterol-free. Research indicates that well-planned vegetarian and vegan diets are appropriate for all ages and have certain health benefits; however, it is not clear whether students are willing to incorporate vegetarian foods into their diets. We assessed students' willingness to purchase vegan menu items in school lunches and evaluate the nutrient profiles of vegan and nonvegan menu items offered. Vegan items were offered once per week for four weeks in elementary and middle school cafeterias located in a demographically diverse school district. Researchers tracked menu items sold, nutrients of menu items offered, and ease of vegan item preparation. Vegan options accounted for more than half of the average number of meals sold at each school on study days. Vegan menu items were lower in total fat, saturated fat, and energy and provided more dietary fiber compared with the competing foods. Food service managers indicated that vegan menu items were easy to prepare. Students are willing to purchase vegan options offered in the school lunch line. Offering vegan school lunches on a regular basis may help food service directors meet nutrient standards and improve child nutrition.

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Background

Excess body weight is increasingly prevalent among children in the United States. Among children aged 6 to 19, prevalence of overweight has tripled in the past 20 years (Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006) contributing to higher rates of childhood health problems, such as asthma (Sithole, Douwes, Burstyn, & Veugelers, 2008) as well as to health risks in adulthood, including cardiovascular disease, hypertension, diabetes, and certain cancers (Vanhala, 1999). Of overweight five- to ten-year-old children, almost 60% already have at least one additional risk factor for heart disease, such as elevated blood pressure or insulin levels (Freedman, Dietz, Srinivasan, & Berenson, 1999).

Child nutrition programs, including school lunch programs, play a vital role in children's health and can help resolve the problem of childhood overweight and obesity. However, many schools struggle to meet U.S. Department of Agriculture standards of 30% or fewer calories from total fat and 10% or fewer calories from saturated fat. In a survey conducted in 2004 and 2005, only 21% of schools met the guidelines for total fat, and 30% of schools met the guidelines for saturated fat (Gordon, Fox, & Clark, 2007). Serving vegan options on a regular

basis could assist schools in meeting nutrition standards for fat content in school lunches, by providing a healthful alternative to high-fat items. Two studies conducted by the United Soybean Board found that serving soy-based foods in place of animal products was acceptable to students and provided a superior nutrient profile (Klein, 2006; Lazor, Chapman, & Levine, 2010). However, these trials did not market the test foods differently (e.g., vegetarian or vegan), and it is unknown whether students are willing to purchase vegan items marketed as such when given the option.

Compared with nonvegetarian diets, vegetarian and vegan diets are generally lower in energy, energy density, total fat, and saturated fat, and higher in fiber and some vitamins and minerals (Dewell, Weidner, Sumner, Chi, & Ornish, 2008; Kennedy, Bowman, Spence, Freedman, & King, 2001; Turner-McGrievy, Barnard, Cohen, Jenkins, Gloede, & Green, 2008). However, placing vegetarian and vegan options in a school food service will have no effect on child nutrition if students do not select them. The present study tested students' willingness to purchase vegan menu items, as indicated by sales, in two schools serving demographically diverse populations.

Methods

Participants. One elementary school and one middle school, both located in Florida, participated in the study. For the 2007-2008 school year, the schools had a combined student population of 2,853, aged 5 to 14 years. Race and ethnicity were reported at these schools as 10% black, 39% white, 5% Asian, 2% multiracial, and 43% Hispanic. Forty percent of students at participating schools received free and reduced-price lunch. The schools were self-elected, their administrators having indicated an interest in providing vegan options for their students. At each school, foods were offered in a lunch line that included three or four main dishes. Neither school offered hot vegan options prior to the intervention.

Instruments. Program participation was measured by the cafeteria management staff using sales data for each item offered during the study period. Ease of preparation was measured by the kitchen manager at each school, who was asked to rate each of the three vegan items, compared to usual nonvegan items, using a scale from 1 to 10, in which 1=easy and 10=difficult. The nutrient content for the vegan and nonvegan items was assessed using nutrient standard menu planning software (NUTRIkids, LunchByte Systems, Inc., Rochester, NY, Version 9.51) or obtained from the product manufacturers.

Procedure. For a four-week period beginning March 2008, a vegan menu item that was low in fat was offered once per week in the cafeteria of each school. These items included a vegetable burger (veggie burger), vegetarian chili, and rice and beans. The veggie burger (*Flame Grilled Gardenburger*, Kellogg, Battle Creek, MI) was a 2.5 ounce soy-based patty served on a whole wheat bun. It was advertised in the lunch line by its brand name. The vegetarian chili (*Tabatchnik*, Somerset, NJ) was served in a 6-ounce container. The rice and beans option was a 1-cup serving prepared in the school kitchens.

At each school, a one-hour optional meeting was held for interested faculty, parents, and students to describe the upcoming introduction of vegan options. On the day before the vegan menu items were offered, students at each school were invited to participate in a taste test during their regularly scheduled lunch period. Bite-sized veggie burger segments were distributed by research staff that circulated in the cafeteria during the lunch period. Elementary school students who tried a sample were offered cartoon stickers featuring vegetable characters with the words "I Veg Out." Middle school students who tried a sample were eligible to enter their names in a raffle for a \$15 Internet music gift card.

Following the taste test, one vegan option was offered as a main menu item one day per week for four weeks. The veggie burger was offered during the first and third weeks, and vegetarian chili and black beans and rice were offered on the second and fourth weeks, respectively. The vegan options were offered alongside other popular nonvegan options: pepperoni pizza, cheeseburgers, and chicken nuggets. To increase awareness of the vegan options, administrators and teachers were asked to post flyers and make announcements over the intercom. The elementary and middle school principals sent parents an announcement about the availability of vegan menu items.

Data Analysis. The proportion of vegan menu items to total items sold was calculated to determine students' willingness to purchase vegan menu items. Nutrient information was compared for energy (kilocalories), total fat (grams), saturated fat (grams), protein (grams), carbohydrate (grams), fiber (grams), and sodium (milligrams) for vegan and nonvegan items. The nutrient content for the black beans and rice, pepperoni pizza, chicken nuggets, and cheeseburger was assessed using nutrient standard menu planning software, and the nutrient information for the veggie burger and the vegetarian chili was obtained from the manufacturers.

IRB Review. The study protocol was submitted for review by a private institutional review board, Independent Review Consulting, Inc. Because the study involved only anonymous data, the Institutional Review Board issued an exemption from review.

Results

The numbers of vegan and nonvegan menu items sold in the elementary and middle schools are shown in Figures 1 and 2. For both schools, the four-day means showed that over half of items sold were attributed to one of the new vegan options. On average, vegan items accounted for 76% of items sold in the elementary school and 56% of items sold in the middle school on the days they were offered.

Using the 10-point scale for ease of preparation, kitchen staff at both sites rated the veggie burger as a 1, meaning that it was deemed easy to prepare. The vegetarian chili was rated 3 at the elementary school and 1 at the middle school. Black beans and rice were rated 2 at the elementary school and 1 at the middle school.

The vegan items were lower in energy, total fat, saturated fat, and protein compared with the competing nonvegan items (Table 1). Vegan items also provided more fiber per serving as compared with the nonvegan items. Both the vegan and the nonvegan items varied widely in sodium content.

Discussion

This four-week program demonstrated that students were clearly willing to purchase vegan menu items, with robust sales on each day they were offered. Cafeteria staff reported ease in preparation. These results suggest that serving vegan menu items that are low in fat appears to be a viable strategy to reduce total fat, saturated fat, and calories of meals offered. Furthermore, offering vegan menu items on a regular basis could increase participation by allowing vegetarian and vegan students to participate in the National School Lunch Program.

Other school-based studies indicate that offering plant-based options can improve nutrient profiles of school lunches. Reilly, Lanou, Barnard, Seidl, and Green (2006) found that offering soymilk in addition to cow's milk increased consumption of calcium-rich beverages and increased the calcium-to-saturated-fat ratio in demographically varied schools. Two acceptability studies served soy products to students in Illinois and Maryland and found the test foods comparable to traditional foods in acceptability and consumption (Klein, 2006; Lazor, Chapman, & Levine, 2010). Soy-based faux-chicken, chili with textured soy, black bean burgers, soy pastas, and three meat-soy hybrids were served in lieu of traditional foods. In the Maryland study, soy-based entrées had 18% fewer calories, 45% less fat, and 57% less saturated fat compared with their meat-based counterparts. The soy products had nearly equal amounts of protein, twice the amount of iron, and six times the amount of fiber, compared with the traditional menu items. The Illinois study results were similar for fat and calories but did not report protein or micronutrients. With the exception of the black bean burger, these soy products were not labeled as vegetarian or vegan. In the current study, students were willing to purchase vegan menu items with modest marketing efforts. This phenomenon held true for both soy-based (veggie burger) and other (vegetarian chili and black beans and rice) vegan options. Together with the current study, these data indicate that a variety of healthful plant-based foods with desirable nutrient profiles can be served in school cafeterias.

The California, Florida, Hawaii, and New York state legislatures have passed resolutions encouraging schools to provide vegetarian and vegan options. The American Medical Association and American Public Health Association have adopted similar recommendations. Vegetarian and vegan diets are healthful for all life stages. According to the American Dietetic Association, "appropriately planned vegetarian diets including total vegetarian or vegan diets, are healthful, nutritionally adequate, and

may provide health benefits in the prevention and treatment of certain diseases" (Craig & Mangels, 2009). Planning is important, particularly for vitamin B₁₂, which is available in fortified breakfast cereals, fortified soymilk, fortified meat analogues, and all common multiple vitamins. Offering a variety of plant-based options at school may help children develop healthful eating habits early in life and reduce their risk for chronic disease.

The study's strengths include being conducted in a large school district with a demographically diverse population. The vegan options included items that were both homemade (black beans and rice) and with Child Nutrition labeling (vegetarian chili and veggie burger). Thus, these are viable options for schools using either the food-based or the nutrient standard menu planning approaches. The study was brief, lasting only four weeks, and each item was presented only once (vegetarian chili and rice and beans) or twice (veggie burger). The study was not designed to assess sales over a sustained period. The study was conducted toward the end of the school year, and sales may have been bolstered by novelty of the new items. Future studies should assess the long-term acceptability of vegan items, include measures of plate-waste, and include cost comparisons of vegan versus nonvegan foods.

Implications for School Health

In the short-term at least, students are willing to purchase vegan options served in school lunches in elementary and middle school. Because these vegan menu items are low in total and saturated fat and high in fiber, they can help school food service administrators meet federal nutrition requirements. Further, serving vegan options may familiarize students with foods that, over the long run, reduce their risk of cardiovascular disease, diabetes, obesity, and certain cancers. Diet patterns that feature legumes, such as dry beans, peas, and lentils, are typically associated with generous intakes of protein, along with fiber, folate, zinc, iron, and magnesium and with low intakes of total and saturated fat (Mitchell, Lawrence, Hartman, & Curran, 2009). Offering these plant-based foods in place of animal products in schools can improve diet quality.

Offering plant-based options as part of a comprehensive school wellness policy may encourage healthful eating patterns, and can complement the benefits of nutrition education and physical activity. Whereas more research is needed to assess the long-term effects of offering plant-based options in schools, providing these items appears to be feasible and beneficial in the short term.

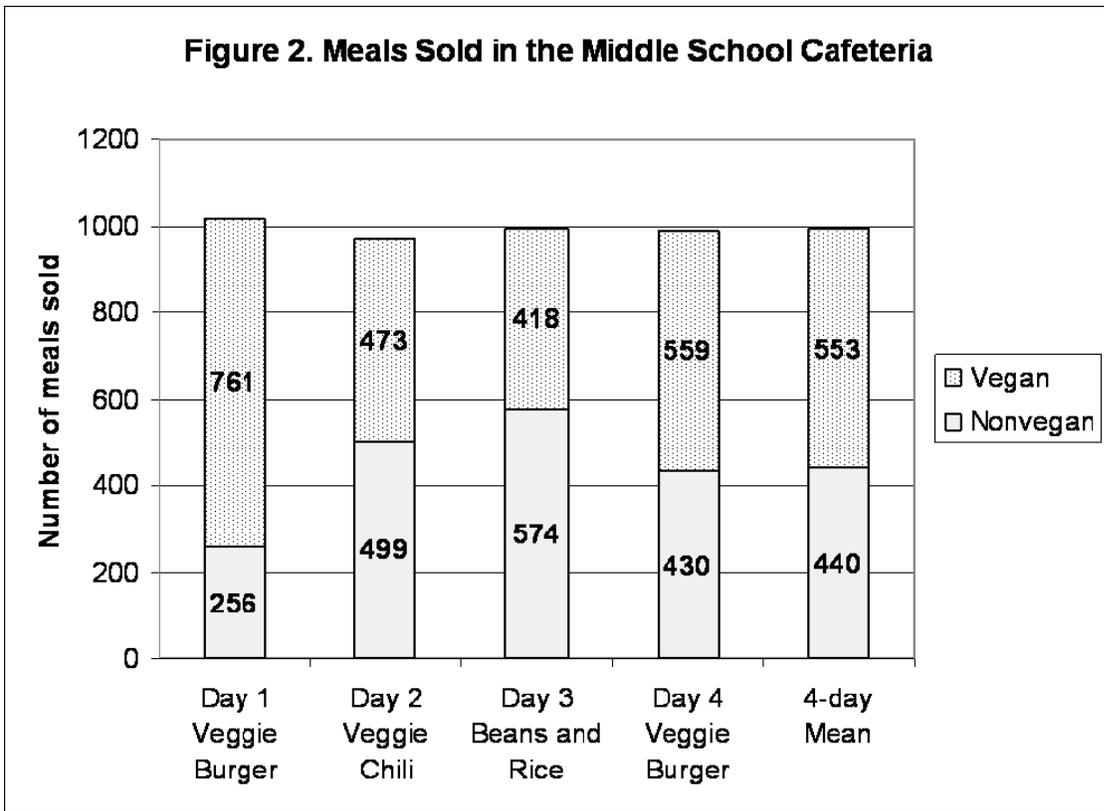
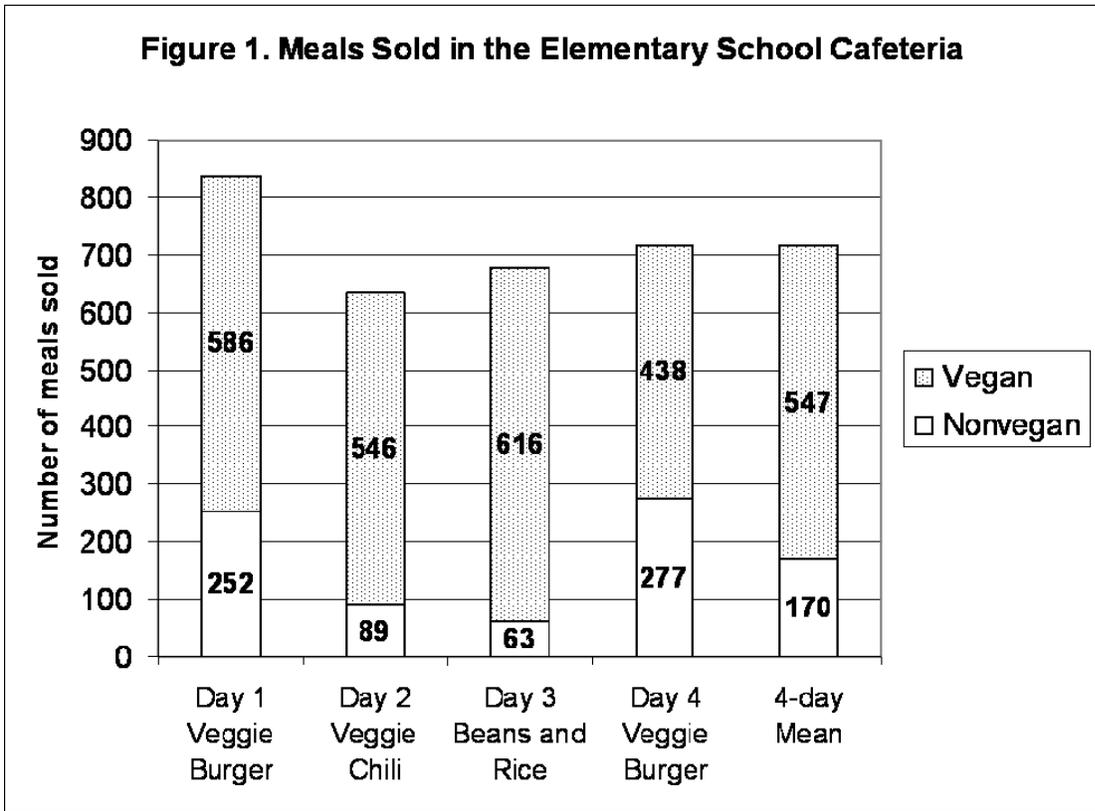


Table 1. Nutrient Content of Menu Items							
	Energy (kcal)	Fat (g)	Saturated fat (g)	Protein (g)	Carbohydrate (g)	Fiber (g)	Sodium (mg)
Vegan menu items							
Veggie burger and bun	200	4	0	16	24	5	530
Vegetarian chili	144	3	0	10	22	6	288
Black beans and rice	240	5	0	9	41	6	979
Nonvegan menu items							
Pepperoni pizza	324	12	7	21	33	2	528
Chicken nuggets	240	18	5	10	10	1	410
Cheeseburger and bun	299	12	5	25	24	2	1010

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