

The Increased Availability and Marketing of Fruit, Juice, and Vegetables to Middle School Students Increases Consumption

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Please note that this study was published before the implementation of Healthy, Hunger-Free Kids Act of 2010, which went into effect during the 2012-13 school year, and its provision for Smart Snacks Nutrition Standards for Competitive Food in Schools, implemented during the 2014-15 school year. As such, certain research may not be relevant today.

ABSTRACT

Objectives

The objectives of this intervention were to determine whether middle school student consumption of fruit, juice, and vegetables (FJV) during school lunch would be increased by: 1) increasing FJV availability and accessibility in the middle school school lunch snack bar/a la carte line; and 2) combining increased FJV availability and accessibility with a social marketing campaign.

Methods

The 15 schools participating in this study were randomized into Intervention A (social marketing and increased availability/accessibility of FJV in both semesters) schools, Intervention B (increased availability/accessibility of FJV only in the first semester; social marketing added to increased FJV in the second semester) schools, and Control schools. Process observations (observations of intervention compliance) and student food consumption at lunch were recorded. Consumption was analyzed for each intervention group and semester using ANOVA. Post-hoc analyses identified specific differences.

Results

Students in availability and marketing schools consumed more fruit and juice (FJ) and fried vegetables than students in availability only and Control schools. Social marketing increased FJ consumption in students.

Application to Child Nutrition Professionals

Adding a social marketing campaign that promotes FJ can increase consumption of FJ during school lunch.

INTRODUCTION

The National School Lunch Program (NSLP) serves 28 million students each day (FNS, 2006). Attention has focused recently on the types of foods available outside of the NSLP meal (GAO, 2004; Gordon et al., 1995). Students gain access to snack bars, a la carte lines, and vending machines in middle school (Cullen et al., 2000; Fox et al., 2001). Previous research suggests that these school food environments may have a negative impact on NSLP participation and student consumption (Blanchette & Brug, 2005). For example, weekly a la carte sales are inversely

related to NSLP participation (Fox et al., 2001). Middle school students with access to snack bar foods consumed fewer fruit and vegetable (FV) servings compared with elementary school students who only received NSLP meals (Cullen et al., 2000). Among students followed from elementary into middle school, consumption of fruit, regular vegetables (i.e., not fried) and milk decreased, while consumption of fried vegetables and sweetened beverages increased (Cullen & Zakeri, 2004). The number of school snack vending machines was negatively related to lunch fruit consumption (Kubik et al., 2003).

School-based interventions have been implemented to encourage student FV consumption. Elementary school programs have had some success. These interventions included classroom and cafeteria components (Gortmaker et al., 1999; Perry et al., 1998; Perry et al., 2004; Reynolds et al., 2000). Only one (Gortmaker et al., 1999) of two middle school nutrition programs found increased FV consumption. Two studies in secondary schools used social marketing to promote FV (Nicklas et al., 1998) and low-fat food sales (French et al., 2004). No changes in FV consumption were found (Nicklas et al., 1998), but increases in low-fat food sales were achieved (French et al., 2004).

The purpose of this research is to examine whether a cafeteria-based social marketing campaign promoting fruit, juice and vegetables (FJV) would increase consumption of these food items among middle school students. Social marketing adapts business marketing practices to a social idea or practice and attempts to achieve an action change, not just an improvement in knowledge, in a specific target population (Andreasen, 1995). Strategies are developed to deal with each element considered important in marketing: Product, Price, Place, and Promotion (Andreasen, 1995).

For the purposes of this project, FJV availability was defined as FJV being present in the school lunch snack bar/a la carte line. Accessibility was through both the packaged form (e.g., cut, sliced, wedged) and in placement (e.g., school lunch snack bar/a la carte line) of FJV, so that students could easily purchase these items during school lunch. With this in mind, this study investigates whether simply increasing FJV availability and accessibility in the school lunch snack bar/a la carte line during lunch would increase consumption of these food items. This study also examines whether combining increased availability and accessibility with a social marketing campaign that advertised the FJV items available in the school lunch snack bar/a la carte line would increase FJV consumption.

METHODOLOGY

The Institutional Review Board of the Baylor College of Medicine approved this study. Formative assessment conducted with middle school students provided data for development of the intervention and supporting materials (Cullen et al., 2005). During the 2001-02 school year, 15 middle schools from three school districts in the greater Houston area participated in this intervention. Students attending these middle schools had access to a school lunch snack bar/a la carte line and the National School Lunch Program (NSLP) meal. Five of the original consenting schools were middle-income (i.e., NSLP free/reduced <40%), while the remaining ten schools were low-income (i.e., NSLP free/reduced >40%). One control school dropped out after

randomization and one week of data collection and is not included in the analyses. Of the remaining schools, five were mostly Hispanic and nine were of mixed ethnicity, for a total of 14 schools. The schools were matched on ethnicity and socioeconomic status before randomization into one of three groups: Intervention A, Intervention B, and Control. In Intervention A, intervention posters were visible throughout the cafeteria, and project-specific FJV were available and accessible in the school snack bar for the entire intervention school year period. Intervention B had only project-specific FJV available and accessible for the first semester. In the second semester, the social marketing posters were added to cafeteria environment. There were no changes made in the control schools.

FJV Availability

A three-week cycle of the intervention FJV items, based on the formative assessment results (Cullen et al., 2005), was developed and implemented during the school year. One fresh fruit (i.e., bananas, sliced apples, or orange wedges), one canned fruit (i.e., peaches, mixed fruit, pineapple, or pears), 100% fruit juice (i.e., apple, grape, or orange), and one raw vegetable (i.e., carrot sticks with dip, shaker salad, or mixed vegetable [carrots, cucumber, broccoli, and tomato] grab bag) were available for purchase at the school lunch snack bar/a la carte line in each cycle.

Intervention Posters

Thirty posters were developed using focus group data collected from students of similar backgrounds (Cullen et al., 2005). These are available online at KidsNutrition.org [LINK TO: http://www.kidsnutrition.org/images/posters3/posters/poster_1.html]. These posters promoted the project-specific FJV items marketed at the snack bar or a la carte line each week. Approximately four different 11 x 17 posters were placed in the cafeteria each week for each food item (i.e., fresh fruit, canned fruit, 100% juice, and raw vegetables) for a total of about 16 posters in the cafeteria per week.

Data Collection

To measure intervention compliance (e.g., lunch time food and beverage availability, presence of marketing posters, and individual student consumption), data collectors were present in the cafeterias. Using a personal digital assistant (Palm Inc., Santa Clara, CA), data collectors recorded daily observations of the cafeteria environment that included presence of the school lunch snack bar/a la carte line, intervention items, and the number and placement of posters.

To measure individual student consumption during lunch, students anonymously completed lunch food records in the cafeterias during the lunch period. A total of 20,320 records were collected for the 14 participating schools (303 food records during baseline; 11,839 during Intervention Period 1; 8,178 during Intervention Period 2). On food records, students listed each food item on a separate line and, with the assistance of the data collectors, indicated the number of servings consumed. Students also identified the source of the consumed food (i.e., “NSLP,” “snack bar,” “home,” or a combination of these sources). Data collectors checked the food records for accuracy and missing data and ensured that all food items were properly described. This method of data collection via food records is considered valid (Domel et al., 1994). Using behavior-coding procedures (Cullen et al., 1999), trained dietitians coded the food records for fruit, 100% fruit juice, other beverages, regular vegetables (i.e., not fried), and fried vegetables

(e.g., French fries and tater tots), in accordance with Food Guide Pyramid serving sizes (USDA, 1996).

Data Analyses

The weekly average servings of specific food groups (i.e., fruit, regular vegetables, fried vegetables, soda, water, fruit juice, other beverages, milk, and all FJV combined) were analyzed using SPSS 11.0 (Chicago, IL) within each data collection period (i.e., Baseline, Intervention Period 1, Intervention Period 2). For each period of data collection and each consumption variable, an analysis of variance (ANOVA) was performed to determine whether differences in consumption existed among the two intervention (i.e., Intervention A and Intervention B) and control groups. When ANOVA analyses revealed differences in consumption among the food groups, post-hoc analyses identified where the differences existed.

RESULTS AND DISCUSSION

During Intervention Period 2, students in Intervention A schools consumed more fruit ($p=0.035$) and fruit juice ($p=0.001$) than Intervention B school students. They also consumed more fried vegetables ($p=0.035$) than students in the Control schools during Intervention Period 1. Intervention B students consumed an average of 0.30 servings ($SE=0.03$) of fruit ($p=0.02$) and 0.38 servings ($SE=0.05$) of fruit juice ($p<0.001$), compared to the 0.20 servings ($SE=0.04$) servings of fruit and 0.24 servings ($SE=0.05$) of fruit juice consumed by students receiving availability/accessibility alone. In the Intervention Period 1 students consumed more fried vegetables ($p=.01$) when FJV availability/accessibility and marketing were combined, compared to students who had no intervention in their schools.

Students in Intervention A and Intervention B schools consumed an average of 0.04 servings ($SE=0.01$) of fried vegetables as compared to the 0.02 servings ($SE=0.01$) consumed by students in the Control group. While this increase was of statistical significance, there is limited practical significance of such a small amount. The amount of non-juice beverages (i.e., milk, soda, water, or other sweetened beverages) or regular vegetables (i.e., not fried) consumed was similar for all schools. Consumption of fried vegetables was the same for all three groups in Intervention Period 2

The overall intervention compliance rates among the schools receiving the intervention were 92.1% and 87.8% for Intervention A and Intervention B schools, respectively. In this study, students did not consume more FJV simply because they were available and accessible in the school lunch snack bar/a la carte line during lunch. This finding was disappointing because previous research with young children has shown that increased exposure to new foods increased consumption (Birch et al., 1987). The FJV foods provided in this intervention were the ones favored by middle school youth (Cullen et al., 2005).

However, when availability/accessibility was combined with a social marketing campaign using student-inspired posters in the cafeteria, students consumed more fruit, juice, and, unfortunately, fried vegetables. The posters were designed to promote specific FJV, using various scenarios with middle school youth, and to increase preference and norms for consuming FJV in schools.

Preferences for fruit and vegetables are a consistent predictor of consumption (Domel et al., 1999). Children consumed more fruit than vegetables (Dennison, Rockwell & Baker, 1998; Monge-Rojas, 2001), which may be due to a preference for fruit over vegetables (Domel et al., 1993). Therefore, it is not surprising that increasing FJV availability and marketing increased FJ consumption, but not vegetables.

Healthier changes in food consumption were found for cafeteria environmental interventions for elementary (Perry et al., 2004) and high school children (Conklin et al., 2005). While classroom nutrition education may be important to the process, students also should have greater access to healthier choices in elementary school. The increase in fried vegetable consumption was unexpected. While no potatoes were included in the social marketing campaign, student consumption of fried vegetables (usually French fries in the school snack bar or a la carte line) increased when the posters were included in the intervention. This increased consumption may be attributed to students considering all potatoes as vegetables; therefore, the posters, which promoted vegetables, unwittingly may have reinforced consumption of all vegetables, including those high in fat.

There are several advantages to a school cafeteria environmental intervention. No classroom time is involved, so student instructional time is not reduced. Plus there is minimal burden on classroom teachers. The school cafeteria is an ideal place for the promotion of healthful foods and is an integral component of the Team Nutrition program [LINK TO: http://teamnutrition.usda.gov/Healthy/execsummary_makingithappen.html]. However, just providing the foods may not be a strong enough intervention that will overcome other barriers that may limit consumption. Interventions outside the school environment also may be needed.

CONCLUSIONS AND APPLICATIONS

Increasing the availability and accessibility of healthy foods, namely FJV, during school lunch may not necessarily increase their consumption. Perceived norms for eating FJV appear to influence middle school student consumption (Thompson et al., 2006). Perhaps the marketing campaign alone was not enough to change such norms. When increased availability and accessibility were combined with an age-appropriate social marketing campaign, however, middle school students consumed more FJV, even from the school lunch snack bar/a la carte line. These results suggest that middle school students will respond to FJV consumer marketing techniques when the marketing complements FJV cafeteria offerings. To increase FJV consumption, school foodservice operations should include age-appropriate social marketing techniques in the presentation of these foods in school food environments. Methods and strategies to positively influence middle school youth food consumption behaviors are important areas for further research.

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