Adding a Social Marketing Campaign to a School-Based Nutrition Education Program Improves Children's Dietary Intake: A Quasi-Experimental Study

Jonathan L. Blitstein, PhD; Sheryl C. Cates; James Hersey, PhD; Doris Montgomery, MS, RD, LD; Mack Shelley, PhD; Christine Hradek, MPH; Katherine Kosa, MS; Loren Bell; Valerie Long, RD, LD; Pamela A. Williams, PhD; Sara Olson, MS, RD; Anita Singh, PhD, RD

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ABSTRACT

Background Evidence supports the use of social marketing campaigns to improve nutrition knowledge and reinforce the effects of nutrition education programs. However, the additional effects of parent-focused social marketing with nutrition education have received little attention.

Objective Our aim was to assess the impact of the Iowa Nutrition Network's school-based nutrition education program (Building and Strengthening Iowa Community Support for Nutrition and Physical Activity [BASICS]) and the benefits of adding a multichannel social marketing intervention (BASICS Plus) to increase parent-directed communication.

Design and intervention A quasi-experimental design with three study conditions compared a school-based nutrition education program (BASICS) with a school-based and social marketing intervention (BASICS Plus) and a no-treatment comparison group.

Participants/setting The study included 1,037 third-grade students attending 33 elementary schools and their parents.

Main outcome measures Measures included parents' reports of their children's in-home consumption of fruits and vegetables (F/V) and use of low-fat/fat-free milk. Data on F/V were collected using a modified version of the University of California Cooperative Extension Food Behavior Checklist; and data on milk use were collected using two questions from the National Health and Nutrition Examination Survey.

Statistical analyses Multilevel, mixed-effect regression models that account for correlation within repeated measures and children within school were used to compare the mean change over time in the outcome variable for one study group with the mean change over time for another study group.

Results Children in BASICS increased mean consumption of fruit by 0.16 cups (P=0.04) compared with children in the comparison group. Children in BASICS Plus increased mean consumption of fruit by 0.17 cups (P=0.03) and mean consumption of vegetables by 0.13 cups (P=0.02). Children in BASICS Plus were 1.3 times (P=0.05) more likely to use low-fat/fat-free milk than children in either the BASICS group or the comparison group.

Conclusions Gaining parents' attention and engaging them in healthy eating practices for their children can be a useful way to increase the effectiveness of school-based nutrition education programs. This study demonstrates the benefits of incorporating a parent-focused social marketing campaign in nutrition education interventions.
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CHILDHOOD OBESITY IS A PUBLIC HEALTH CONCERN. Recent estimates indicate that 17% of youth aged 2 to 19 years in the United States were obese in 2011 to 2012.[1,2] The immediate and long-term health consequences of childhood obesity are troubling. Obese children are more likely to develop diabetes[3,4] and cardiometabolic disorders,[5,6] and these children suffer more negative social and emotional outcomes than normal-weight children.[7,8]

School-based nutrition education programs attempt to reduce behaviors that can lead to obesity by teaching children about the benefits of eating a healthy diet that includes adequate amounts of fruits and vegetables (F/V) and choosing

low-fat/fat-free dairy options. F/V have high water content and low energy density, which can lead to feelings of satiety that reduce energy intake and prevent weight gain.[9] While milk consumption is associated with overall better dietary quality[10] and development of optimal bone mass,[11] whole milk is a major source of total fat and saturated fat,[12] and low-fat/fat-free options are recommended for children 2 years of age or older.[13] Despite recommendations, the majority of children in the United States continue to drink whole milk and 2% milk, although the prevalence of whole-milk consumption has declined in recent years.[14]

School-based nutrition education programs reach children in a place where they are predisposed toward learning. The majority of children eat at least one and often two meals per day in schools, affording the opportunity for practical application of new knowledge and skills.[15] However, school-based nutrition education programs have had mixed success in reducing obesity[16] and influencing dietary behavior.[17-20] A review of 24 studies of children aged 5 to 12 years found that school-based interventions moderately improve daily fruit intake but have minimal impact on daily vegetable intake.[18] One reason for the limited success of school-based interventions may be conflicting influences beyond the school setting. Nutrition education may fail to promote behavior change when strong cultural influences and social expectations drive dietary choice.[21] Interventions aimed at improving children's diets may falter when parents fail to create supportive home environments. Parents, and the home environment they create, are primary shapers of children's behavior.[22-28] Parents provide modeling that can help children internalize beliefs and attitudes that support a healthy diet and physically active lifestyle.[29,30] Parental practices also determine children's access to healthy foods in the home.[31,32]

School-based nutrition education interventions may be able to capture parental attention through the use of community-based social marketing campaigns.[33,34] Systematic reviews highlight evidence showing that social marketing can improve nutritional knowledge, improve nutrition-related psychosocial variables (eg, preference and self-efficacy), and encourage a variety of healthy eating behaviors.[35,36] Community-wide campaigns, such as the "1% or Less" campaign, have demonstrated that a social marketing campaign can produce significant and sustained behavior change in a cost-effective way.[37,38]

This study addressed the question, "Can a social marketing campaign directed at parents increase the effectiveness of a school-based, nutrition education curriculum among a primarily low-income population?" To answer this question, the impact evaluation assessed the Iowa Nutrition Network's efforts to improve diet and diet-related outcomes of third-grade students by adding a social marketing campaign to Building and Strengthening Iowa Community Support for Nutrition and Physical Activity (BASICS), a school-based nutrition education program administered by the Iowa Department of Public Health. The BASICS program is supported by the US Department of Agriculture's Supplemental Nutrition Assistance Program Education, a nutrition education and obesity prevention grant program. Although all Supplemental Nutrition Assistance Program Education programs are encouraged to conduct self-evaluations, the US Department of Agriculture initiated a series of independent evaluations to identify model programs of nutrition education that effectively change eating behaviors.

The evaluation compared pre-intervention and post-intervention measures of fruit consumption, vegetable consumption, and use of low-fat/fat-free milk among third-grade students exposed to one of the following study conditions: (1) a treatment group that included third-grade students participating in the BASICS program; (2) a treatment group that included third-grade students participating in BASICS Plus, which included the standard BASICS program along with a multichannel, community-based social marketing intervention; and (3) a no-treatment comparison group that included third-grade students who did not participate in the BASICS program and were not exposed to the social marketing campaign.

We hypothesized that third-grade students who participated in either the BASICS program or BASICS Plus program would increase mean F/V consumption and would be more likely to use low-fat/fat-free milk than third-grade students in the no-treatment comparison group. In addition, we hypothesized that third-grade students who participated in the BASICS Plus program would increase mean F/V consumption and would be more likely to use low-fat/fat-free milk than third-grade students in the BASICS program.

METHODS

Overview of the BASICS and BASICS Plus Programs

The BASICS program was designed to improve diet and diet-related health outcomes based on social cognitive theory.[39,40] The goals of the BASICS program are to increase F/V consumption and the use of low-fat/fat-free dairy products consistent with the 2010 Dietary Guidelines for Americans[13] and to increase daily levels of physical activity.

The BASICS intervention included eight 30-minute nutrition education and physical activity lessons administered in classrooms by trained nutrition educators and additional nutrition and physical activity education activities administered by classroom teachers over a 7-month intervention period. BASICS lessons were developed around the Pick a Better Snack nutrition education program that Iowa Nutrition Network nutrition educators have used for more than a decade. BASICS reinforces key nutrition education and physical activity messages by providing take-home materials and activities for parents or caregivers and their children. Previous evaluations of the BASICS program have shown it to be an effective mechanism for increasing preferences for F/V and low-fat/fat-free milk products.[41]

The BASICS Plus intervention had the same goals and approach for nutrition education and was supplemented with a multicomponent social marketing campaign. Program planners focused community activities in supermarkets and outdoor signage in areas around participating schools to increase exposure among low-income households with children participating in BASICS. The campaign encompassed two sets of messages. The first set reiterated the Pick a Better Snack goals of eating F/V as snacks; this messaging was aimed at children and parents. The second set included parent-focused messages targeted to low-income women aged 18 to 34 years with the aim of encouraging the switch to low-fat/fat-free milk products (eg, "Their Bodies Change, So Should Their Milk"). Message delivery included (1) point-of-purchase signage