



Evaluating a school-based fruit and vegetable co-op in low-income children: A quasi-experimental study



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ABSTRACT

The purpose of this study was to evaluate the effectiveness of a new school-based food co-op program, Brighter Bites (BB), to increase fruit and vegetable intake, and home nutrition environment among low-income 1st graders and their parents. This was a non-randomized controlled comparative effectiveness trial (2013–2015). Six schools received BB ($n = 407$ parent-child dyads); six comparison schools implemented a coordinated school health program ($n = 310$ parent-child dyads) in Houston, Texas, 2013–2015. Brighter Bites (BB) is a 16-week school-based food co-op comprising weekly distribution of fresh produce (50 servings); nutrition education in schools and for parents; and weekly recipe tastings. Measurements included parent-reported home nutrition environment surveys, and food frequency questionnaires for parent and child. Intervention effects were examined using multivariate analyses. At baseline, the sample was 71% Hispanic, 24% African American; 43% of 1st graders were overweight/obese. Children receiving BB had significant increases in intake of fruit servings ($P = 0.046$), vegetable servings ($P = 0.049$), and decreased intake of added sugars ($P = 0.014$). Among parents, there were significant increases in fruit consumed ($P = 0.032$); vegetable intake increased baseline to midpoint but not post-intervention. Among BB families, there were significant improvements in the home environment including understanding and usage of nutrition facts labels to make food purchases ($P < 0.05$), frequency of cooking ($P = 0.007$), rules and practices regarding eating family meals ($P = 0.022$), serving fruits ($P = 0.005$) and vegetables ($P = 0.028$) at meals, and limiting portion sizes ($P = 0.016$).

In conclusion, a school-based food co-op model shows promising results in improving dietary habits and home nutrition environment among low-income families.

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1. Introduction

Most children in the United States (U.S.) do not meet the recommended intakes of healthy foods including fruits, vegetables and whole grains, putting them at risk for chronic diseases later in life. Recent reports from the Centers for Disease Control and Prevention (CDC) using the National Health and Nutrition Examination Survey (NHANES) data between 2003 and 2010 indicate a 12% per year increase in intake of fruit among children ages 6 to 11 years, and among those from low-income families; however, there were no increases in intake of vegetables or whole grain foods (Kim et al., 2014). Also, 30% of the intake of vegetables was from fried potatoes or potato chips,

and none of the socio-demographic groups met the recommended intakes for fruits or vegetables (Kim et al., 2014).

Experts have identified home and the school as important settings to improve dietary habits among children (Story et al., 2008a). Specifically among school settings, federal policies and programs such as the Healthy Hunger Free Act of 2010 (United States Department of Agriculture, Food and Nutrition Service, 2016) require schools participating in the National School Lunch Program and School Breakfast Program to increase the amounts and variety of fruits and vegetables (F&V) on their menus. However, studies comparing pre and post implementation of the new nutrition standards show an increased plate waste post-implementation, despite the school meals being more nutritious in offering a wider selection of F&V (Ishdorj et al., 2015; Smith and Cunningham-Sabo, 2014). These studies suggest a lack of preference and demand for F&V among children, underscoring the need for innovative nutrition education models. The social-ecological model posits several individual, environmental, community level, and cultural factors influence what people eat (Story et al., 2008b). The school and home environment, including peer, parent, and teacher interactions influence

Abbreviations: CATCH, Coordinated Approach To Child Health.

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dietary habits among children (Story et al., 2008b). Given that over 50 million children attend school in the U.S. every day, these are important settings to engage families and create opportunities for healthy eating among children. Brighter Bites is a 16-week school-based intervention that uses a food co-op model to increase access to fresh F&V using reclaimed produce aggregated at local food banks combined with nutrition education for low-income children and their families. We present the results of a study to determine the effectiveness of Brighter Bites in improving intake of F&V and parental food practices, rules and meal-time environment among 1st grade children and their parents in Houston, Texas.

2. Methods

2.1. Study design

This was a quasi-experimental non-randomized controlled school-based study conducted in Houston, Texas.

2.2. Setting

Public or charter schools were eligible to participate if they enrolled 1st grade children and >75% of the children in the school were enrolled in the free/reduced lunch program.

2.3. Study population

Families were recruited into the study as parent-child dyads in which the “parent” was the adult family member primarily responsible for caregiving. Enrollment in the study was limited to one parent-child dyad per family. While all 1st grade children and their families were invited to participate in Brighter Bites, only those consenting to participate were measured. A convenience sample of nine elementary schools were recruited over two school years. In year 1 (2013–2014 school year), 1st grade parent-child dyads across six elementary

schools (three receiving Brighter Bites; three comparison schools) were recruited. In year 2 (2014–2015 school year), the three schools that were in the comparison group in year 1 crossed over to the intervention group to receive Brighter Bites, three new schools were recruited to be in the comparison group, and a new cohort of 1st grade children and their parents was recruited across these six schools. Data were collected pre-intervention (baseline), at the intervention's midpoint (8-weeks follow up), and post-intervention (16-weeks follow up). At baseline, a total of 717 parent-child dyads consented to participate in the study ($n = 407$ intervention, $n = 310$ control) (Fig. 1).

This study was approved by the Institutional Review Board of the University of Texas Health Science Center in Houston. All study documents were in English and in Spanish.

3. Brighter Bites intervention description

Brighter Bites (Sharma et al., 2015) is a 16-week school-based program, grounded in the Social Cognitive Theory (Bandura, 1986) and the Theory of Planned Behavior (Ajzen, 1991), combining access to F&V and nutrition education among low-income children and their families. It includes: 1) weekly distribution of 50–60 servings (~30 lb) of fresh, donated produce procured from the local food banks sent home to the families eight weeks in fall and eight weeks in spring; 2) weekly healthy recipe tastings during pick up time, featuring produce provided that week; 3) health education in schools and for parents. Schools were trained in the Coordinated Approach To Child Health (CATCH) program, an evidence-based coordinated school health program with proven obesity prevention effects in children (Hoelscher et al., 2010). Parent-child nutrition education includes a set of two bilingual handbooks and weekly recipe cards sent home with the parents. The weekly recipe cards featured produce in the bags. Fig. 2 outlines the program components and logic model.

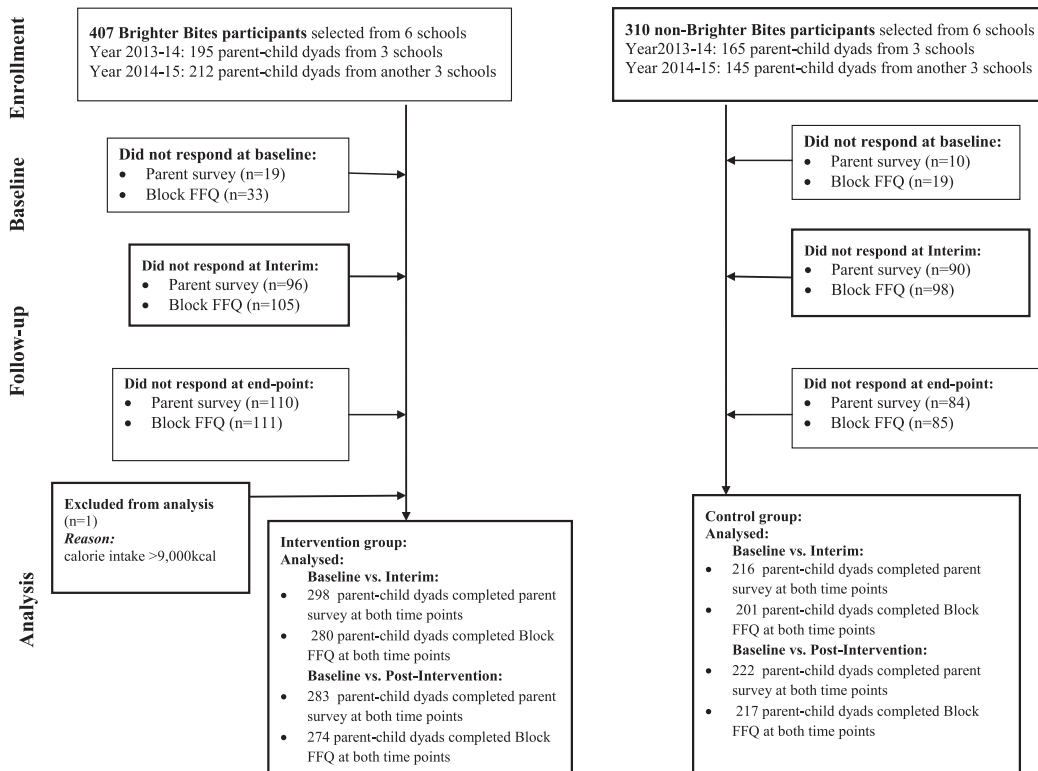


Fig. 1. Study flow, Brighter Bites study, Houston, Texas, 2013–2015.

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