

Breakfast-Skipping and Selecting Low-Nutritional-Quality Foods for Breakfast Are Common among Low-Income Urban Children, Regardless of Food Security Status^{1–3}

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Abstract

Background: Universal access to the School Breakfast Program (SBP) is intended to help low-income and food-insecure students overcome barriers to eating breakfast. However, SBP participation is often still low despite universal access. Further information is needed with regard to these children's breakfast behaviors, and in particular breakfast behaviors among youth from food-insecure families, to inform effective breakfast interventions.

Objectives: The objective of this study was to examine breakfast behaviors among a large sample of urban students with universal access to the SBP and to identify differences in breakfast behaviors among children from food-secure compared with food-insecure households.

Methods: A cross-sectional study of 821 fourth- through sixth-grade students and their parents from 16 schools was conducted. Students reported the foods/drinks selected and location of obtaining food/drink on the morning of data collection, parents reported household food security status using the 6-item Food Security Survey Module, and the school district provided SBP participation data during the fall semester of 2013. Multivariable linear regression models accounting for school-level clustering were used to examine differences in breakfast behaviors across 3 levels of household food security: food secure, low food secure, and very low food secure.

Results: Students participated in the SBP 31.2% of possible days, with 13% never participating in the SBP. One-fifth (19.4%) of students purchased something from a corner store for breakfast, and 16.9% skipped breakfast. Forty-six percent of students were food insecure; few differences in breakfast behaviors were observed across levels of food security.

Conclusions: Despite universal access to the SBP, participation in the SBP is low. Breakfast skipping and selection of foods of low nutritional quality in the morning are common, regardless of household food security status. Additional novel implementation of the SBP and addressing students' breakfast preferences may be necessary to further reduce barriers to students obtaining a free, healthful breakfast. This trial was registered at clinicaltrials.gov as NCT01924130. *J Nutr* 2016;146:630–6.

Keywords: School Breakfast Program, breakfast, children, dietary intake, food insecurity

Introduction

Breakfast presents a key opportunity to promote healthful nutrition and other positive behavioral and academic outcomes

among children. Children who regularly eat breakfast show higher intakes of key food groups, such as fruit and dairy, better overall dietary adequacy, and are more likely to meet recommendations for intakes of essential micronutrients (1–3). Regular breakfast consumption has also been associated with a lower prevalence of obesity among children in some studies (4–6). Beyond the nutritional benefits of eating breakfast, regular breakfast has been found to promote positive cognitive and academic outcomes among children, with children who regularly eat breakfast having higher grades, achievement test scores, and school attendance (7–9). Despite these numerous benefits of breakfast, breakfast is the most commonly skipped meal of the

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day, with low-income and food-insecure children the most likely to report that they do not regularly eat breakfast (10, 11).

In the United States, the School Breakfast Program (SBP)⁹ is an important federal initiative to ensure that low-income children who may not have access to consistent, healthful meals at home gain the benefits of regular breakfast consumption. Nationwide, >88,000 schools and institutions participate in the SBP. As with the National School Lunch Program (NSLP), children from households with an income $\leq 130\%$ of the poverty guidelines are eligible for free breakfast, whereas those from households with an income $\leq 185\%$ of the poverty guidelines are eligible for reduced-price breakfast. Despite recent growth in participation in the SBP, student participation is consistently lower than desired. Nationwide, in 2013–2014, only 53.2% of students who participated in the NSLP participated in the SBP (12). In an effort to increase SBP participation, particularly among children living in poverty, many school districts are implementing novel adaptations of the SBP such as serving breakfast in the classroom during the first period of the morning or offering “grab and go” breakfast that students can take with them to class (13). In particular, many school districts that serve a predominantly low-income student population now provide Universal School Breakfast, which offers all children breakfast at no charge, regardless of family income. Universal School Breakfast aims to reduce barriers to low-income students’ participation in the SBP, most notably any remaining economic barriers as well as the stigma that children report experiencing when there is a perception that the SBP is only for poor children (14).

A small number of studies suggest that Universal School Breakfast may not have as promising an effect on student nutrition or academic outcomes as hoped (14–17). For example, in a randomized trial that compared the nutritional effects of universal breakfast access, Crepinsek et al. (16) observed that although participation in the SBP significantly increased with universal access, there were few other changes in students’ dietary intake, including the prevalence of breakfast skipping and the dietary quality of breakfast consumed. Participation in the SBP also still varies widely between major urban centers despite universal access; for example, Oakland, California and New York City report <40% participation in the SBP among students who participate in the NSLP (18). Together, these data suggest that there remains much that is unknown with regard to the breakfast patterns and preferences of low-income, school-aged children.

The lack of knowledge of breakfast patterns and preferences is particularly true for children who experience food insecurity. Children from food-insecure households are more likely to experience nutrient deficiencies (19, 20) and have poorer dietary adequacy, including lower intakes of whole grains (21) and fruit (22) and higher intakes of added sugars (21, 23), compared with their food-secure peers. Children in households experiencing food insecurity have additionally been observed to learn less during the school year and to have lower academic scores, particularly in reading and mathematics (24, 25). For these reasons, consistent access to a healthful breakfast may be particularly important for the health and academic outcomes of food-insecure children. To date, a small number of studies have found that older children and adolescents from food-insecure homes eat breakfast less frequently and are more likely to skip breakfast than youth from food-secure homes (11, 26, 27). Kahn et al. (27) further observed that although food-insecure middle

school students were less likely to consume breakfast at home, they were more likely to consume breakfast at school through participation in the SBP, resulting in no differences in overall breakfast frequency between food-secure and -insecure children. Although these studies suggest variation in the frequency and location of adolescents’ breakfast intake by food security status, to our knowledge no studies have examined breakfast behaviors among younger children from food-insecure households or whether the composition of children’s breakfasts varies by household food security status.

In the current study we examined breakfast behaviors, including breakfast skipping, breakfast location, food and drink choices, and participation in the SBP, among a large sample of urban, predominantly low-income, fourth- through sixth-grade students with universal access to the SBP. Given the potential great importance of breakfast to food-insecure youth and that the intention of the SBP, and Universal School Breakfast specifically, is to provide stigma-free access to a healthful breakfast for the most nutritionally vulnerable children, we examined differences in breakfast behaviors by students’ household food security status. Understanding what and where low-income and/or food-insecure children choose to eat when they have access to Universal School Breakfast can provide essential insight to increase participation in the SBP and improve children’s dietary quality at breakfast and throughout the day.

Methods

The current study is a cross-sectional analysis of baseline data collected by the School Breakfast Policy Initiative (SBPI), a school-based randomized controlled trial designed to test the effect of classroom breakfast and accompanying nutrition education on students’ breakfast behaviors and weight status. Schools with grades kindergarten through eighth grade were invited to participate in the study if >50% of students in the school were eligible for free and reduced-price meals; of those 29 schools that met eligibility criteria, 25 were invited to participate and 16 were enrolled. Parental consent and child assent forms in English, Spanish, Chinese, or Arabic were sent home with all fourth- through sixth-grade students in September 2013, and students were asked to return signed forms. Parental consent and child assent to participate in the SBPI was obtained from 1463 parent-child dyads (53% of eligible dyads). Of consented students, 1372 (93.8%) completed valid in-school study measurements, which were collected in the morning after cafeteria breakfast, but before students’ scheduled school lunches, between September and December 2013. All baseline data were collected before the implementation of the SBPI intervention. After children were enrolled in the study, the 6-item short form of the Food Security Survey Module (FSSM) was sent home to parents via their child to assess household food security status. The FSSM was provided to parents in English, Chinese, or Spanish based on the language of the SBPI consent form that parents returned. Among parents whose children enrolled in the study, 60.3% ($n = 828$) returned the FSSM either via mail using a prepaid envelope or to their child’s classroom. Seven parents returned an incomplete FSSM; therefore, data from 821 parent-child dyads were used in the current study. Sociodemographic differences between students who did and did not return a completed FSSM were examined. Students with and without household food security information did not vary in respect to race/ethnicity, free/reduced-price school meal eligibility, or participation in the SBP during the fall of 2013. Female students were significantly more likely to return a completed FSSM than male students ($P < 0.001$). The study was approved by the Office of Research and Evaluation at the School District of Philadelphia and the Institutional Review Board at Temple University (NCT01924130).

⁹ Abbreviations used: BPS, Breakfast Patterns Survey; FSSM, Food Security Survey Module; NSLP, National School Lunch Program; SBP, School Breakfast Program; SBPI, School Breakfast Policy Initiative.

Measures

Breakfast location and composition. The Breakfast Patterns Survey (BPS), a self-report measure developed for use with urban middle school-aged children, was used to determine participants' breakfast food consumption and source location on the morning of data collection (28, 29). The BPS is a short survey that is administered in the classroom midmorning. Students completed the BPS electronically with the assistance of trained research assistants. The BPS asks students if they ate or drank anything that morning (yes or no) from any of 4 locations: home, a corner store, the school cafeteria, or another location. If children reported that they ate or drank something that morning from a given location, they were asked to select the items they ate or drank from a list of food categories (e.g., muffin/doughnut/pastry/cake/pie, fruit, waffles/French toast/pancakes, yogurt/cheese). The 17 food/drink categories were adapted from the Block FFQ (30). If students responded affirmatively with regard to eating or drinking from another location, they were provided the ability to write in what the other location was, and what foods and/or drink they consumed. These "other" locations and "other" foods were recoded into existing categories by consensus among the research team, if applicable, or left as "other location" or "other food" if they did not fit into existing categories. Students who reported only consuming water from a given location were considered having not eaten food or drink from that location.

Food security. Household food security status was measured by using the 6-item short form of the FSSM (31). This measure identifies the ability of households to obtain and conserve food over the past 12 mo and has been shown to correctly classify 97.7% of families when compared with the full 18-item survey used in the Current Population Survey (32). When parents responded in the affirmative to <2 items, their households were categorized "food secure"; those who responded in the affirmative to 2–4 items had households categorized as experiencing "low food security"; and those who responded in the affirmative to ≥ 5 items had households categorized as experiencing "very low food security." Low household food security indicates that families have experienced reduced quality, variety, or desirability of diet but little to no need to reduce food intake. Very low food security indicates family members have experienced disrupted eating patterns and reduced food intake due to their inability to access acceptable food.

Student sociodemographic characteristics and participation in the SBP. The school district provided data on participating students' birth date, sex, race, ethnicity, and free or reduced-price lunch status. Student age was calculated from birth date and the date of data collection. Participating students' number of days in attendance and days participating in the SBP for September through December 2013 were also provided by the school district, allowing for calculation of the proportion of days in attendance that students participated in the SBP.

Student weight status. Children had their height and weight measured in a private space at each school by trained study staff with the use of a standardized protocol. BMI percentile was calculated on the basis of sex and age via the CDC 2000 growth charts (33). Because there were a very small number of underweight children (BMI <5th percentile; $n = 25$), underweight and normal-weight (BMI ≥ 5 th percentile and <85th percentile) children were collapsed into a single category. Children whose BMI percentile was ≥ 85 th but <95th were categorized as overweight, and those whose BMI percentile was ≥ 95 th were categorized as obese (34).

Statistical analysis

Descriptive statistics including chi-square for categorical variables and ANOVA for continuous variables were used to examine the distribution of demographic variables and students' weight status by food security status. Associations between household food security status and breakfast behaviors, including the proportion of students skipping breakfast, frequency of participation in the SBP, and proportion of students eating foods from specific locations, were examined by using hierarchical linear regression models (35) accounting for within-school clustering of

outcomes (36). In the event that the overall comparison of proportions/means was significant across household food security levels, post hoc pairwise comparisons of proportions were conducted by using P values adjusted for the number of comparisons for a 5% family-wise error rate. In this framework, P values <0.03 were considered significant. All of the analyses were performed with SAS version 9.4 (SAS Institute).

Results

Student characteristics. Among the 821 students in the study sample, the mean age was 10.8 y, 44.8% were male, and nearly two-thirds (65.2%) were African American (Table 1). Approximately 80% of students qualified for free or reduced-price school meals, and 54% were from a food-secure household; 27.5% experienced low household food security and 18.5% experienced very low household food security, the most extreme form of household food insecurity. There were no significant differences in student age, grade, sex, race/ethnicity, eligibility for free or reduced-price school meals, or weight status by household food security status.

Breakfast frequency, location, and participation in the SBP. Among the total sample, 83.1% reported eating breakfast on the morning of data collection, with 29.5% reporting selecting breakfast items from multiple locations. Among students who ate or drank on the morning of data collection, the most common breakfast location was home (79.2%), followed by school (38.8%) and the corner store (19.4%). Students participated in the SBP on 31.2% of days they attended school, with 87.0% of students participating in the SBP at least 1 d during the fall 2013 semester (Table 2). Examining student characteristics associated with participation in the SBP, boys participated in the SBP on a greater proportion of days than did girls (33.6% compared with 29.3%; $P = 0.047$). Racial and ethnic differences in SBP participation were also observed. Black students participated on 36.5% of days, Hispanic students participated on 25.0% of days, and white students participated on 18.7% of days ($P < 0.001$). No differences in SBP participation were observed by free or reduced-price meal eligibility, grade, or student weight status.

There were few differences in breakfast source location by students' household food security (Table 2). Compared with students with very low household food security, students with low household food security were less likely to have eaten breakfast from home on the morning of data collection (72.9% compared with 83.8%; $P < 0.03$) and were more likely to report consuming food or drink from an "other" location, which included locations such as a daycare center, community center, or a family members' home, than were food-secure peers (9.8% compared with 4.1%; $P < 0.03$). Students from food-secure households did not differ from students from food-insecure households in their utilization of the SBP.

Breakfast food and beverage food choices. Among students who ate or drank on the morning of data collection, the most commonly consumed food and drink items were milk (47.0% of students), cereal (37.2%), and 100% fruit juice (31.7%). A portion of students also reported consuming snack foods and foods that tend to be high in fat and/or added sugar for breakfast, including candy (8.2%), chips (7.9%), and soda and other sugar-sweetened beverages (7.9%). Comparing food and drink type across levels of household food security, students who experienced low household food security were less likely to report consuming milk (37.8% compared with 49.4%; $P < 0.03$)

TABLE 1 Sociodemographic characteristics and weight status of students participating in the School Breakfast Policy Initiative, overall and by household food security status

	Total (<i>n</i> = 821)	Food-secure (<i>n</i> = 443)	Low food security (<i>n</i> = 226)	Very low food security (<i>n</i> = 152)	<i>P</i> ¹
Total, %	100.0	54.0	27.5	18.5	
Sociodemographic characteristics					
Age, ² y	10.8 ± 0.03	10.8 ± 0.05	10.7 ± 0.06	10.8 ± 0.08	0.55
Grade, %					0.77
Fourth	36.4	54.5	29.1	16.4	
Fifth	35.1	52.8	27.1	20.1	
Sixth	28.5	54.7	26.1	19.2	
Sex, %					0.18
Male	44.8	51.6	30.7	17.7	
Female	55.2	55.9	24.9	19.2	
Race/ethnicity, %					0.29
African American	65.2	53.5	28.0	18.5	
Hispanic	16.6	52.9	29.4	17.7	
White	7.6	59.7	14.5	25.8	
Other	10.7	54.6	30.7	14.8	
Free/reduced-price meal eligible, %	79.7	53.7	28.1	18.3	0.72
Weight status, %					0.96
Underweight/normal weight	61.6	53.8	27.5	18.8	
Overweight	18.0	52.0	29.1	19.0	
Obese	20.3	56.3	26.4	17.4	

¹ *df* = 2.² Values are means ± SEs.

and more likely to report consuming candy (11.5% compared with 8.4%; $P < 0.03$) compared with food-secure peers (Table 3).

Discussion

The goal of the current study was to examine breakfast behaviors among a large sample of urban students who have universal access to the SBP, with specific attention to differences in breakfast behaviors among children from food-secure compared with food-insecure households. Despite universal access to the SBP, which is intended to remove financial and social stigma barriers to consuming school breakfast, 16.9% of children

reported skipping breakfast on the morning of data collection. This proportion of students who skip breakfast is similar but slightly higher than what has been observed among same-aged students in New York City (15%) (29) and higher than among same-aged students in California (13%) (37) who had access to the SBP in the cafeteria. In addition, students only consumed school breakfast on 31.2% of possible days during the semester. These data mirror the SBP participation rates observed in other major cities with highly disadvantaged student populations (18) and underscore the fact that SBP is underutilized even among food-insecure students, who are in greatest need of access to a regular healthful breakfast.

TABLE 2 Breakfast frequency, location, and participation of students in the School Breakfast Program, overall and by household food security status¹

	Total (<i>n</i> = 821)	Food-secure (<i>n</i> = 443)	Low food security (<i>n</i> = 226)	Very low food security (<i>n</i> = 152)	<i>P</i> ²
Ate breakfast, %	83.1	84.0	85.1	77.3	0.11
Eating locations, ³ <i>n</i>	1.2 ± 0.03	1.2 ± 0.05	1.3 ± 0.06	1.1 ± 0.07	0.19
Ate at >1 location, %	29.5	29.8	31.6	28.4	0.78
Breakfast location, ⁴ %					
Home	79.2	79.8 ^{a,b}	72.9 ^b	83.8 ^a	0.05
Corner store	19.4	18.5	22.1	17.8	0.53
School	38.8	39.4	43.3	34.9	0.32
Other (e.g., child care, friend's home)	6.2	4.1 ^b	9.8 ^a	6.9 ^{a,b}	0.03
Percentage of possible days participating in the School Breakfast Program	31.2	33.2	35.4	35.9	0.42
Any school breakfast participation, %	87.0	88.1	85.9	87.2	0.69

¹ Labeled percentages in a row without a common letter differ, $P < 0.03$. Models were adjusted for school-level clustering of outcomes.² *df* = 2.³ Values are means ± SEs.⁴ Among students who reported eating on the morning of data collection.

TABLE 3 Breakfast food and beverage choices by students, overall and by household food security status¹

	Total (n = 821)	Food-secure (n = 443)	Low food security (n = 226)	Very low food security (n = 152)	P ²
Cereal	37.2	40.9	32.1	32.6	0.07
Milk	47.0	49.4 ^a	37.8 ^b	50.5 ^a	0.02
Bread (e.g., bagel, toast, roll)	15.7	15.6	16.7	14.5	0.88
Breakfast sandwich	15.6	16.0	17.4	9.2	0.13
Waffles, French toast, or pancakes	23.2	22.4	19.5	25.6	0.45
Muffin, donut, pastry, cake, or pie	21.2	22.4	19.7	21.7	0.74
Chips	7.9	7.8	7.8	8.6	0.96
Yogurt or cheese	17.8	17.8	16.0	17.7	0.86
Eggs	17.8	16.7	17.7	21.4	0.51
Meat, chicken, or fish	12.7	11.8	13.5	13.7	0.79
Fruit	19.4	19.4	21.1	15.4	0.46
Vegetables	4.9	4.6	4.2	6.8	0.53
100% Fruit juice	31.7	34.2	31.3	31.4	0.72
Sugar-sweetened beverage [e.g., soda, lemonade, Capri Sun (KRAFT Foods)]	7.9	7.5	8.8	7.7	0.86
Candy	8.2	8.4 ^{a,b}	11.5 ^a	3.3 ^b	0.04
Coffee, tea, or iced tea	8.7	9.1	9.4	6.0	0.53

¹ Values are percentages of students who reported eating on the morning of data collection. Labeled percentages in a row without a common superscript letter differ, $P < 0.03$. Models were adjusted for school-level clustering of outcomes.

² df = 2.

Study findings suggest that the Universal School Breakfast does not sufficiently remove the barriers to SBP participation. In particular, students' inability to arrive at school early in order to eat breakfast in the cafeteria has been noted as one of the most prominent barriers to SBP participation (38, 39), yet universal access alone does not help students overcome this barrier. Novel strategies to increase SBP participation, including breakfast in the classroom or offering "grab and go" breakfast options, may have more success at increasing meal participation among food-insecure students than universal access alone, because they do not require that students get to school early. For example, breakfast in the classroom has been found to boost SBP participation 2-to 4-fold by both increasing access during the school day and minimizing the social cost associated with participation in the SBP (17, 40–42). Student preferences also likely play a role in their breakfast choices. For example, concerns about the palatability of school breakfasts and the alignment of foods offered with children's taste preferences have been raised by parents, students, and school staff (43). Modifying menus to more closely align with student preferences in conjunction with reducing time barriers and stigma may further increase participation in the SBP.

A large proportion of students' parents or caregivers reported household food insecurity. Whereas the prevalence of household food insecurity observed among the study sample was 2.3 times the national prevalence, among families living below the poverty line 23.5% of families experienced low food security and 18.5% experienced very low food security nationally in 2013 (44). These figures align with the findings of the current study, which was conducted in schools that serve a high percentage of low-income families, and show the great nutritional vulnerability among families living in poverty. In previous studies of breakfast habits among food-insecure youth, food-insecure adolescents were more likely to skip breakfast than were food-secure adolescents (11), and among early adolescents food-insecure youth were less likely to

consume breakfast at home but more likely to consume breakfast at school than their food-secure peers (27). In the current study, relatively few differences in students' breakfast behaviors were found by household food security status. This relative consistency of breakfast behaviors may reflect the age of the participants: younger children are often protected from reduced food intake due to household food insecurity compared with adolescents and adults (45–49). In addition, although the study sample was not homogenous with respect to food security status, a large proportion of students qualified for free or reduced-price school meals. Therefore, the lack of many differences in breakfast patterns by household food security status may reflect barriers to consistent, healthful eating for low-income families even if they are not identified as food insecure.

As has been observed in previous studies in urban youth (28, 29, 50, 51), corner store food purchases were common among fourth- through sixth-grade students, regardless of household food security status, with 19.4% of those who ate breakfast reporting that they ate something purchased at a corner store on the morning of data collection. Similarly, among fourth- through sixth-grade students in New York City, 20.3% reported consuming something from a "bodega" in the morning (29). Furthermore, in the current study, ~8% of students reported consuming soda, candy, and/or chips for breakfast, which are the most commonly purchased foods from corner stores (50, 52). These food items are inexpensive and highly accessible to low-income children. A study in fourth- through sixth-grade Philadelphia students identified that, on average, students spent \$1.07 per corner store shopping trip and purchased 356.6 kcal of food and/or drink (50). Interventions to increase urban, low-income children's participation in the SBP and improve breakfast quality may benefit from addressing students' use of corner stores in the morning.

This study has several strengths including its large sample of low-income, urban students and use of objective data on school food program participation. Furthermore, the 6-item short form

of the FSSM was used to measure food security. This measure has shown high validity for assessing food insecurity among households with children when compared with the gold standard 18-item US Household Food Security Survey Module (32). However, child-level, compared with household-level, food security was not assessed. Therefore, the extent to which children's intake was restricted due to lack of family food resources was not able to be determined. A limitation of the study is that the BPS has not been validated against an objective measure of dietary intake and measures only a single day of breakfast food and drink choices; therefore, the data captured may not accurately represent the regular breakfast patterns of children. In addition, whereas the BPS captures general intake from food and beverage categories, it cannot be used to determine quantity or quality of the foods and beverages consumed or food consumption later in the day. Therefore, the nutrient composition of breakfast or dietary compensation for breakfast could not be determined.

Among this sample of low-income, urban grade-school children, household food insecurity was highly prevalent, and children participated in the SBP only approximately one-third of possible days despite universal access, which intends to eliminate barriers to SBP participation. Overall, the high proportion of breakfast skipping, consuming food from corner stores in the morning, and consuming foods of low nutritional quality suggests that all students would benefit from nutrition interventions to improve breakfast quality, regardless of household food security status. Continued research is needed to understand in greater depth why students make the breakfast food and drink choices they do and to identify whether alternative methods of SBP implementation, such as breakfast in the classroom, are effective in increasing breakfast consumption and improving breakfast quality among the most nutritionally vulnerable children.

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HD, JOF, GDF, and KWB designed the research; HD and HP conducted the research; HD, AD, and KWB analyzed the data; KWB had primary responsibility for final content; and HD, AD, JOF, HP, SS, MLA, LCD, and KWB wrote the manuscript. All authors read and approved the final manuscript.

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