

Breakfast Quality Varies by Location among Low-Income Ethnically Diverse Children in Public Urban Schools

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ABSTRACT

Objective: To evaluate breakfast location and children's food choices.

Methods: Cross-sectional analysis of 1,371 fourth- through sixth-grade students in 2013. Foods and beverages in 17 categories characterized breakfast choices: (1) ≥ 1 fruits or vegetables, (2) ≥ 1 foods high in saturated fats and added sugars (SFAS), and (3) meeting *School Breakfast Program* (SBP) requirements.

Results: Among breakfast eaters ($n = 1,133$; 82.6%), 46.0% ate at home, 13.1% ate at school, 41.0% ate at multiple locations; and 21.8% ate at a corner store. Those eating at school were more likely to consume ≥ 1 fruit or vegetable (odds ratio [OR] = 1.90; 95% confidence interval [CI], 1.26–2.87), less likely to eat ≥ 1 SFAS food (OR = 0.46; 95% CI, 0.22–0.94), and more likely to meet SBP requirements (OR = 2.47; 95% CI, 1.42–4.29). Those eating at corner stores ($n = 247$) were more likely to consume high-SFAS foods (63.9% vs 9.2%; $P < .001$).

Conclusions and Implications: Eating school breakfast increased the odds of consuming fruit, choosing lower SFAS, and meeting nutritional requirements of the SBP relative to other locations.

Key Words: breakfast, children, eating patterns, school meals, corner stores (*J Nutr Educ Behav.* 2017;■■:■■–■■.)

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INTRODUCTION

Among US children aged 6–11 years, breakfast provides 18% to 19% of total daily energy intake but a relatively greater proportion of daily intake of several nutrients of public health concern among Americans,¹ including vitamin D (40% to 42%), calcium (26%), fiber (21%), and iron (32%).²

Breakfast consumption has been positively associated with academic outcomes.^{3–5} Conversely, 12% to 34% of US children report skipping breakfast, which has been associated with a 2–5 times lower likelihood of meeting recommended nutrient intakes,⁶ poorer memory,^{5,7} and a twofold increased risk of obesity.^{3,8–11} Thus, whether children eat breakfast

is important.^{3,11–15} This study examined the extent to which the types of breakfast foods children consume are influenced by location.

School has become an increasingly important context for breakfast. The US *School Breakfast Program* (SBP) was permanently authorized in 1975 to provide nutritious breakfasts, targeting lower-income children.¹⁶ Currently, the SBP serves approximately 11.2 million children per day.¹⁷ Eating breakfast at school vs home is associated with higher daily intakes of some nutrients including energy, protein, and sodium.^{6,18} Alternatively, many youth report eating in the morning at corner stores,^{9,19–21} where food purchases tend to be rich in energy and low in nutrients.²¹ However, little is known about the influence of location on children's breakfast food choices.

The objective of this research was to evaluate children's breakfast food choices based on location(s) among low-income, urban, fourth- to sixth-grade youth. Specifically, the research team evaluated whether consumption of fruits and vegetables (FV) or

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foods high in saturated fats and added sugars (SFAS), as well as meeting nutritional (ie, meal component) requirements of the SBP at breakfast varied based on whether consumption occurred at school, home, and/or corner stores.²² Currently, a majority of school-aged children do not meet recommended guidelines for FV and exceed the 2015 Dietary Guidelines for Americans' SFAS recommendations.^{1,23} Understanding the role of location in the quality of children's breakfast choices may inform interventions to improve breakfast consumption among youth.

METHODS

Design

The researchers conducted a cross-sectional analysis using baseline data from a randomized control trial to promote school breakfast consumption. All participating schools had universal breakfast policies in which breakfast was available to all students free of charge before school in the cafeteria. Data were obtained in October through December, 2013. Students completed measures in the morning, after the cafeteria breakfast was offered and before scheduled lunches. No schools offered snacks before lunch. Students completed surveys independently on electronic tablets. Trained research staff provided instructions and were available during survey administration to answer questions. The school district provided additional student sociodemographic data.

Participants and Setting

Participants were fourth- to sixth-grade students recruited from 16 kindergarten to eighth-grade Philadelphia public schools. Schools were eligible if they met the following inclusion criteria for the larger trial from which baseline data presented here were taken: (1) at least 50% of students qualified for free or reduced price lunch, (2) they did not have an existing classroom breakfast feeding program (or were willing to give up classroom breakfast feeding for the duration of the study), and (3) they received *Supplemental Nutrition Assistance Program–Education* nutrition

programming. The student-level exclusion criterion was developmental or behavioral disorders affecting the ability to understand and/or complete the breakfast survey.

Schools were matched for school size, race/ethnicity composition, and food service type (full-service vs satellite cafeterias); 25 schools were invited to participate. Nine schools declined owing to an unwillingness to accept randomization. Eligible and participating schools were similar to other schools in the district with respect to percent minority, size, and percent qualifying for free and reduced lunch.²⁴ Mean \pm SD percent eligibility for free or reduced-price meals from the *National School Lunch Program* for the 16 schools at the time of school recruitment (spring, 2013) was $89.7\% \pm 6.3\%$. The study was approved by and conducted in accordance with the ethical standards of the Office of Research and Evaluation at the School District of Philadelphia and the Institutional Review Board at Temple University.

Research staff visited each classroom to explain the study and distribute consent and assent forms. All fourth- through sixth-grade classrooms in the enrolled schools participated in the study. Among the 2,715 eligible students, active parental consent and child assent were obtained for 1,463 students (53.9%); consent rates did not differ by condition (intervention: 54.6%, control: 53.7%). Students did not receive compensation for participation; the 16 schools each received \$1,000 for participating. From the sample, 91 children were removed from analyses (42 transferred schools before data collection, 31 started the classroom breakfast portion of the intervention during the baseline period, 10 were in special education, 4 had incomplete height and weight measurements, 1 was chronically absent, and 1 had missing survey data). The final sample consisted of 1,371 children.

Measures and Data Collection Procedures

The school district provided children's race/ethnicity, sex, month and year of birth, and grade level. Children's race/ethnicity, as categorized by the school district based on parent

report, was black, Hispanic, white, Asian, or other.

Children's self-reported breakfast intake on the day of the breakfast patterns survey was assessed using a questionnaire developed for ethnically diverse, low-income, school-aged children in New York City.^{9,20} Foods and beverages in 17 categories included typical breakfast foods (eg, milk and eggs categories) from school menus used in Philadelphia^{9,21} and New York City,²⁰ as well as nontypical breakfast foods (eg, chips and candy categories). Children were first asked, *Did you eat/drink anything today?* Children who answered affirmatively marked foods and beverages consumed in 17 categories separately for each of 4 locations: home, corner store, school cafeteria, and other. Students were instructed to omit foods that had been acquired but not yet consumed. Foods were recorded as being consumed in the location where the food was acquired. Children who reported drinking only water were not counted as having consumed breakfast. On average, students took approximately 5–10 minutes to complete the survey.

Children's food choices at breakfast were characterized in several ways. Consumption of high-SFAS foods was characterized by intake of ≥ 1 foods in the following categories (yes/no): chips, candy, and sugar-sweetened beverages. Consumption of SFAS was evaluated with and without the categories of muffins, donuts, and pastries because low-saturated fat versions of these foods were served as part of the SBP at the time of the study. Consumption of FV was characterized by eating ≥ 1 foods in the following categories (yes/no): fruits, vegetables, and 100% fruit juice; consumption was evaluated with and without 100% fruit juice. Meeting nutritional requirements of the SBP was characterized by 1 of the following meal component combinations in accordance with 2014–2015 guidelines²²: (1) 1 FV, 1 grain, and 1 milk; (2) 1 FV and 2 grains; or (3) 1 FV, 1 grain, and 1 meat or meat alternative. Of the 17 food categories assessed, consumption of foods and drinks from the fruits, vegetables, and 100% fruit juice categories were counted as meeting the FV component. Consumption of foods from the

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