

School Water Access, Food and Beverage Intake, and Obesity

Statistical Analysis Plan

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Outcomes

Height and weight of students were measured by researchers using standardized protocols from the National Health and Nutrition Examination Survey study at baseline, 7-months, and 15-months. These measures were used to obtain the primary outcome of interest: prevalence of overweight and obesity in students using Centers for Disease Control and Prevention growth curves (BMI percentile for age and sex: $\geq 85\%$ = overweight; $\geq 95\%$ = obesity). Secondary outcomes of BMI percentile, mean BMI, BMI z-score were also obtained from these anthropometric measurements.

Other secondary outcomes included students' dietary intake. At baseline and 7-months, daily food and beverage calories were measured using a gold standard 24-hour dietary recall adapted from the National Health and Nutrition Examination Survey study that was augmented with a validated food and beverage diary method used widely in studies of school-aged children. After training on diary use led by the study team, students took home the diary (in English or Spanish), which included pictured measuring aids, measuring cups and spoons, and instructions to have an adult help with measuring and recording all beverages and foods consumed. The next day, researchers met with students individually to conduct multiple pass 24-hour recalls.

At all timepoints, a validated instrument also assessed past-week frequency of beverage consumption to examine longer-term changes in water and SSB intake.

Control variables included students' demographics including self-reported age, sex, and race and ethnicity, screen time, and physical activity. Students reported the amount of time they spent the day before the survey playing video or computer games, watching movies or programs, and doing other things on the computer or phone. Students reported the level of physical activity that made them breathe hard or sweat in the previous week as: none, sometimes (1–2 times), often (3–4 times), quite often (5–6 times), or very often (7 or more times).

Sample Size Justification

This study is powered based upon our main outcome - percentage of overweight/obese students. For power calculations for all of our study outcomes, we assumed 80% retention of eligible students in target study classrooms at 15 months after the start of the study. Accounting for such attrition, with 26 schools, at least 50 fourth-grade students per school, and an intraclass correlation of 0.005, we had 80% power to detect a 5% between-group difference in the change in overweight prevalence at 15 months.

Statistical Analysis

Analyses were performed in StataSE version 15.1. Mixed-effects logistic regression models examined between-group changes in the adjusted prevalence of overweight and obesity between baseline and 7- and 15-months follow-up. The primary predictor was the intervention status by

time interaction. To account for clustering, models included random intercepts for student, school, and class. Models also included random slopes that allowed for differential changes among individual students over time. We adjusted for year to capture secular trends, and controlled for students' self-reported race and ethnicity, sex, and age, and physical activity and screen time at baseline.

Similar mixed effects linear regression models assessed secondary continuous outcomes of weight status (BMI percentile, mean BMI, BMI z-score), dietary outcomes including total calories from foods and beverages, beverage frequency, and the proportion of students in schools observed drinking water. Because of skewed distributions, dietary outcomes were log-transformed and regression coefficients were exponentiated to derive the percent change in outcomes by intervention status over time.