

Impact of the School Breakfast Program on the National School Lunch Program in an Elementary School

Karen Spears, PhD, RD, University of Nevada, Reno

Background

In 2006, 9.8 million children participated in the School Breakfast Program (SBP) and 30 million participated in the National School Lunch Program (NSLP) which together cost \$10.2 billion. The intent of these two programs is to provide “a coordinated and comprehensive child food service in schools” (P.L. 89-842). Yet, the nutritional interaction between SBP and NSLP has not been examined. In addition, the regulation was amended on October 2001 allowing eligible schools to offer meals at no charge to all enrolled students.

The study examines the influence of energy and nutrient consumption at SBP upon NSLP consumption in response to change in SBP service location (cafeteria vs. classroom) and the introduction of universal-free meals. Additionally, important influential factors in this interaction are evaluated (e.g. time-lapse between SBP and NSLP, student’s age and gender).

Unfortunately, research in this area is impeded by the limitations of dietary assessment methodologies. Young children lack the literacy, cognitive abilities, and attention span required in commonly used dietary intake instruments (food frequency questionnaires, food diaries, and dietary recall). To overcome these limitations, a unique new Spears Point-of-Sale Dietary Assessment Tool (Spears POS-DAT) was developed. This study served to determine the accuracy, reproducibility, and implementation cost of the Spears POS-DAT compared to the traditional observational technique. Direct observation of food intake was selected because it is considered the “gold standard” and is frequently the criterion used to validate diet survey tools.

Methods

Students were recruited from one classroom kindergarten-5th grade at an elementary school in Reno, Nevada. Data was collected at three time periods (beginning, middle and end) during the 2007-2008 school year. At the first time period (pre-intervention), school breakfast was served in the cafeteria at a cost charge. SBP and NSLP intake were obtained using the Spears POS-DAT. During the second time period, school breakfast was offered in the classroom and meals were universal-free. Spears POS-DAT determined SBP and NSLP consumption. In addition, direct observation of food intake was obtained at lunch for validation of Spears POS-DAT. The third time period, replicated the data collection procedure at the second time period to assess Spears POS-DAT reliability.

Information regarding each enrolled student’s age, gender, race/ethnicity, height and weight were obtained. In addition, information obtained at each time period included: breakfast intake prior to arrival to school, appetite rating, food preference rating of items served during the study period and a one day food diary.

Prior to initiating the study, all school food items and their nutrient values were inputted into the Spears POS-DAT computer. Children enrolled in the study were provided an identification (ID) badge. A staff member generated a computer inventory of foods selected by a student by scanning their ID badge and food barcodes and weighing bulk foods. Any food remaining on their returned trays were weighed and subtracted to automatically calculate actual intake. Direct observational intake data was gathered on a random subsample of students at lunch and entered into Nutritionist Pro database for nutrient analysis.

The prospective cohort study design strengthens the inference of cause-effect relationship regarding pre- and post-implementation of the universal-free meal program.

Findings

All study data is collected and entered into a computer database. Each student’s intake for calories, carbohydrates, protein, total fat, calcium, Vitamin C and iron are calculated for all time periods by Spears POS-DAT and direct observation. Statistical analysis of data is scheduled to be completed in December.

A total of 165 students were recruited and 157 enrolled. Over the study period, 28 students moved or withdrew from the study. Seventy-five percent of students were White-Hispanic. Trends observed, but not statistically confirmed, included:

- Breakfast intake when served in the cafeteria was substantially lower than breakfast served in the classroom.

- Breakfast intake in younger children was greater than in older children with the reverse observed at lunch.
- Average lunch intake for calories, total fat, and iron were below, protein exceeded, and calcium met 1/3 of dietary reference intake.

A student's perceived hunger (ranking 1-5) was associated to consumption of school breakfast.

Statistical analysis to determine the validity of Spears POS-DAT is completed. The findings indicated that the Spears POS-DAT is a valid method of dietary assessment. Observation and Spears POS-DAT intakes were obtained in 401 students during January 2008 (second time period). Correlation coefficients were 0.8 for all nutrients. Bland-Altman plots showed no systemic or proportional bias. However, paired-t test results were mixed. Mean calories, protein and calcium consumption at lunch were not significantly different between Spears POS-DAT and direct observation. Yet, mean lunch intake of carbohydrates, total fat, Vitamin C and iron differed between Spears POS-DAT and direct observation. The sample size may be inadequate to detect no difference between the two methods. Our sample size will be doubled when May data is included in the analysis. It is also possible that the Spears POS-DAT data is closer to "true" intake than direct observation.