

# Fruit and Vegetable, Fat, and Sugar-Sweetened Beverage Intake Among Low-Income Mothers Living in Neighborhoods With *Supplemental Nutrition Assistance Program–Education*

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## ABSTRACT

**Objective:** To examine among low-income mothers the consumption of fruits and vegetables (FV), high-fat foods, and sugar-sweetened beverages (SSBs) and overall diet quality in relation to levels of reach of *Supplemental Nutrition Assistance Program–Education* (SNAP-Ed) interventions across 2,907 California census tracts.

**Design:** Cross-sectional telephone survey conducted from April through October, 2014 using the Automated Self-administered 24-Hour Recall dietary assessment.

**Participants:** Mothers or primary caregivers (n = 6,355) from randomly selected SNAP households. The sample was 42.6% Latina, 25.5% white, and 17.6% African American. The response rate was 60.5%.

**Main Outcome Measures:** Cups of FV; calories from high-fat foods; and cups of SSBs, overall and from items purchased from fast-food restaurants. Overall diet quality was assessed by the Healthy Eating Index–2010.

**Analysis:** Linear regression controlling for race/ethnicity and education, with significance at  $P \leq .05$ .

**Results:** Mothers from high SNAP-Ed reach census tracts ate more cups of FV, consumed fewer calories from high-fat foods, and drank fewer cups of SSBs. Healthy Eating Index–2010 scores did not vary by levels of SNAP-Ed reach.

**Conclusions and Implications:** *Supplemental Nutrition Assistance Program–Education* interventions are related to increased intake of FV and decreased consumption of high-fat foods and SSBs, but not overall diet quality. Future studies should include assessment of physical activity to investigate caloric balance in association with levels of SNAP-Ed interventions.

**Key Words:** fruit, vegetable, SNAP-Ed, ecological, 24-hour recall, nutrition education, mother, fat, sugar-sweetened beverage (*J Nutr Educ Behav.* 2016; ■:1–8.)

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## INTRODUCTION

The US Department of Agriculture (USDA) *Supplemental Nutrition Assistance Program–Education* (SNAP-Ed) is the most widespread program designed to promote and possibly

change behaviors in support of healthy lifestyles among low-income populations in the US. *Supplemental Nutrition Assistance Program–Education* nutrition and physical activity interventions are aimed at persons within households with an income at or

below 185% of the federal poverty level, who are defined by the USDA as SNAP eligible, which in federal fiscal year (FFY) 2014 exceeded 46.5 million.<sup>1</sup> Mothers are a primary target population for such interventions because they are the persons from SNAP households most likely to be responsible for the purchase of food and preparation of meals, and serve as role models for children's eating habits.<sup>2</sup>

*Supplemental Nutrition Assistance Program–Education* interventions can range from individual or group-based to community or public health approaches in line with the recommendations and restrictions outlined in annual guidance issued by the USDA. Whereas the stated goal of SNAP-Ed is to “improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active

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lifestyles consistent with the current Dietary Guidelines for Americans,"<sup>2</sup> interventions in California are mostly or entirely nutrition focused. In fact, when the USDA has initiated studies to test the effectiveness of SNAP-Ed, the selected interventions have addressed only dietary behaviors, with fruit and vegetable consumption serving as the primary outcome variable. These highly controlled, high-dose interventions have found increased fruit and vegetable consumption resulting from SNAP-Ed.<sup>3,4</sup>

Observational studies designed to test associations between SNAP-Ed and increased fruit and vegetable intake would offer greater generalizability of the efficacy of such interventions. However, assessment of the independent variable would be problematic because most SNAP-Ed participants would not know when asked whether a particular intervention in which they participated was SNAP-Ed affiliated; service providers are not required and do not explicitly identify their interventions as SNAP-Ed.

The ecological study design addresses this problem by comparing summary statistics of outcome measures from individuals within groups in relation to exposures available at the same aggregate level.<sup>5</sup> This approach has been used to show that the incidence of human immunodeficiency virus decreased over time within 81 cities with needle exchange programs and increased within 52 cities without such programs,<sup>6</sup> and to demonstrate relationships between increased body mass index (calculated from self-reported height and weight) and living closer to fast-food restaurants and convenience stores.<sup>7</sup>

One study that used the ecological research approach to evaluate SNAP-Ed found that low-income California adults living in census tracts with higher levels of SNAP-Ed intervention reach, defined as the number of SNAP-Ed recipients over the number of SNAP-Ed-eligible persons, reported an increased frequency of consumption of fruits and vegetables.<sup>8</sup> One strength of this study over previous research was that the independent variable was based on the diverse types and intensities of SNAP-Ed interventions implemented throughout California. This study also found the frequency of eating fast-food and

levels of SNAP-Ed reach to be negatively related, which suggested that such interventions increase the intake of fruits and vegetables and reduce the intake of unhealthful foods.

Reducing the consumption of unhealthful beverages in addition to unhealthful foods is a focus of SNAP-Ed interventions in California. The statewide *Rethink Your Drink* campaign provides educational messages and materials for recognizing beverages with added sugar and the link between sugar-sweetened beverages and health risks.<sup>9</sup> In FFY 2014, California SNAP-Ed service providers reported that 16% of the over a half-million SNAP-Ed recipients participated in direct education interventions that included *Rethink Your Drink* messages and materials (E. Talmage, unpublished data, 2015).

The objective of the current ecological study of low-income mothers was to examine levels of reach of SNAP-Ed interventions across California census tracts in relation to dietary intake and overall diet quality. Specifically, consumption of fruits and vegetables; high-fat, fast-food type foods; and sugar-sweetened beverages, overall and for purchases from fast-food restaurants, were hypothesized to correlate significantly with levels of SNAP-Ed intervention reach. Scores for the Healthy Eating Index–2010 (HEI-2010),<sup>10</sup> a valid and reliable measure of diet quality in accordance with the recommendations of the Dietary Guidelines for Americans, 2010,<sup>11</sup> were also examined in relation to SNAP-Ed intervention reach. Higher levels of SNAP-Ed reach and HEI-2010 scores would provide empirical evidence that such interventions are related to overall dietary behaviors and not only to the intake of selected types of healthful and unhealthful items.

## METHODS

### Sample and Recruitment

The study population represented the target population for SNAP-Ed interventions: mothers (or primary caregivers) of children. The sampling frame was the California Department of Social Services, Medi-Cal Eligibility Data System, a database that is updated quarterly with the names, contact information, and limited demographics

such as age for persons from households receiving SNAP throughout California. Sampling procedures involved the random selection of households with at least 1 adult woman and 1 child aged 5–17 years from the 17 largest California local health departments (LHDs).

Recruitment procedures began with letters of introduction sent to mothers or addressed to the youngest adult woman in households with > 1 adult woman, as identified in the Medi-Cal Eligibility Data System. This step was taken to increase the chance that the letters would be received by mothers with children aged < 18 years. Next, telephone calls were conducted to confirm study eligibility, interest in participation, primary language, and contact information. Mothers were offered a \$10 incentive to participate in a telephone survey scheduled for a later date. This study was reviewed and approved by the California Health and Human Services Agency, Committee for the Protection of Human Subjects.

### Survey

The Automated Self-administered 24-Hour Recall (ASA24)<sup>12</sup> was used to assess dietary behaviors. Trained interviewers from the organization that developed the ASA24 with the National Cancer Institute used the Web-based system to administer the dietary assessment by telephone in English or Spanish. Before the ASA24 interview, mothers who expressed interest in participating in the survey during the initial screening and recruitment telephone calls were sent measuring cups and spoons and a *Size Up Your Portion: A Guide to Food Serving Sizes* booklet. During the subsequent telephone survey the interviewers referenced the cups, spoons, and portion-size images from the booklet to assist mothers in selecting the precise amount of each food and beverage they recalled consuming for each meal during the past 24 hours. Information such as cooking methods, added items such as condiments, and place of purchase was also recorded when applicable.

The ASA24 does not include demographic questions; survey participants'

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