

Improved Overall Quality of Diets Reported by Expanded Food and Nutrition Education Program Participants in the Mountain Region

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ABSTRACT

Objective: To evaluate the Expanded Food and Nutrition Education Program, a large US Department of Agriculture nutrition education program for low-income people, by comparing the overall quality and cost of diets when entering and exiting the program.

Methods: Secondary analysis of data collected in 2011 from female participants in the Mountain region. Dietary recalls were collected by paraprofessionals. Outcome measures were the differences between Healthy Eating Index–2005 scores and costs of diets at entry and exit. Significance was determined using the Wilcoxon signed-rank test.

Results: At entry the mean total Healthy Eating Index–2005 score was 49.1 (out of a possible 100) and at exit, 55.2 ($P < .001$) ($n = 3,338$). Eight of 12 component scores also improved significantly whereas the sodium score worsened. The estimated median cost of diets was 13% higher at exit compared with entry.

Conclusions: Participants' overall diet quality improved and was accompanied by an increase in food cost.

Key Words: evaluation, diet, Dietary Guidelines for Americans, poverty, US Department of Agriculture (*J Nutr Educ Behav.* 2015;47:421–426.)

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INTRODUCTION

The Expanded Food and Nutrition Education Program (EFNEP) is a large US Department of Agriculture (USDA) nutrition education program for low-income people.¹ The program is administered by USDA's National Institute for Food and Agriculture and serves audiences in all 50 states, the District of Columbia, American Samoa, Guam, Micronesia, Northern Marianas, Puerto Rico, and the Virgin Islands. The adult program, targeted at families with young children, is designed to provide the knowledge, skills, attitudes, and behavior change

necessary for nutritionally sound diets. Participants gain skills in food production, preparation, storage, safety, and sanitation; they learn to better manage their food budgets and related resources available from federal, state, and local food assistance agencies and organizations. The program is delivered in community settings or, less often, in participants' homes as a series of weekly lessons by paraprofessionals (peer educators).

Family and consumer science professionals provide on the job training and supervise the paraprofessionals who deliver the EFNEP program. The paraprofessionals typically live in

the communities where they work. They recruit participants personally and receive referrals from current and former participants as well as from community organizations and agencies.

The Healthy Eating Index (HEI), described below, is a measure of the quality of the total diet and is used by the USDA to monitor the diet quality of Americans. It is widely used in nutritional epidemiology but it has not been widely used in program evaluations, including EFNEP. Evaluations of EFNEP program outcomes have consistently shown positive results, but those that assess nutrition-related outcomes have focused on select dietary components of interest rather than on the quality of the total diet.^{2–5} Therefore, the primary objective of this study was to evaluate the effectiveness of the nutrition education component of the EFNEP program in the US Census Mountain region by comparing the HEI scores of diets reported by female participants when entering the program with those reported when exiting.

A secondary objective was to compare the estimated cost of diets when entering the program with

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those when exiting. Existing studies dealing with cost have considered the cost and benefits of delivering the program,⁶⁻⁹ but to the authors' knowledge none have considered changes in the costs of participants' diets. Therefore, the null hypotheses tested were: (1) there was no difference in the quality of the participants' total diet when entering and exiting EFNEP and (2) there was no difference in the estimated cost of participants' diets.

METHODS

Participants

This study was a secondary analysis of dietary data collected from EFNEP participants in the 8 states of the US Census Mountain region, where the first author resides, from October, 2010 through September, 2011. These data were the most recent available at the time the analysis was conducted. Because diet quality is known to differ between men and women¹⁰ and because the vast majority of EFNEP participants are women, men were excluded from the sample. The dataset used for this study was preexisting and deidentified; therefore, review by an institutional review board was not required per US Department of Health and Human Services guidelines.¹¹

Of the 3,965 adult EFNEP participants from this region, 503 were excluded because they were men, 95 were excluded because their records had missing food codes or amounts, and 29 were excluded as statistical outliers because their reported energy intakes were above the 75th percentile plus 3 times the interquartile range (ie, above 4,577 kcal on either day). No energy intakes were below the 25th percentile minus 3 times the interquartile range; furthermore, no one was excluded because of low energy intake because consumption of a small amount of food is possible on a single day. The analytic sample size was 3,338.

Data Collection and Preparation Procedures

During the first and last lessons, the participants provided 24-hour dietary recalls using paper forms with standard questions under the guidance of

the peer educators.¹² The information on the forms was later coded using a system called the Nutrition Education Evaluation and Reporting System (NEERS), developed by the EFNEP national office. NEERS used the USDA's Food and Nutrient Database for Dietary Studies (FNDDS) to assign numeric codes to the foods that were reported by participants and to convert the amounts of foods reported into grams. In 2011, NEERS was used in over 800 locations throughout the 50 states and 6 US territories and provided a variety of reports and summary data.¹³

One of the authors (BRL) requested and obtained the NEERS-generated 24-hour recall data from the EFNEP national office in SAS format and used JMP 10 (SAS Institute, Inc, Cary, NC, 2012) to merge the EFNEP data with 4 USDA databases. The first 3 were used to create the variables needed to calculate the main outcome measure, Healthy Eating Index–2005, which is described below: (1) the FNDDS¹⁴ for energy and nutrient intakes; (2) the MyPyramid Equivalents Database¹⁵ for amounts of the food groups and subgroups found in the USDA Food Patterns¹⁶; and (3) the MyPyramid Equivalents Database for Whole Fruit and Fruit Juice¹⁷ to separate the fruit group into whole fruit and fruit juice. The MyPyramid Equivalents Database effectively disaggregates the foods consumed by participants into their ingredients and reaggregates them into the food groups used by the USDA for dietary guidance. For example, a participant's intake of total vegetables would include the celery in the tuna salad she ate at lunch, the potatoes and tomatoes from beef stew at dinner, and the carrot sticks she ate as a snack.

The fourth database, the USDA/CNPP Food Prices Database,¹⁸ which contains national average prices of foods reported in the National Health and Nutrition Examination Survey, was used to estimate the cost of foods reported during the entry and exit recalls. This database uses the same food codes used in NEERS and the FNDDS. The dollar value of all foods reported on each day was calculated. The prices were not adjusted for inflation; however, such adjustment would not have changed the percentage increase in cost, which was the outcome of interest.

Diet Quality Measure

The main outcome in this study was diet quality. It was assessed using the HEI, a measure of diet quality in terms of conformance to the Dietary Guidelines for Americans,¹⁹ and the USDA Food Patterns, which are recommendations for types and amounts of food to eat at 12 calorie levels.¹⁶ The HEI-2005,²⁰ rather than the 2010 version,²¹ was selected as the diet quality indicator because most data were collected before dissemination of new consumer messages related to the 2010 Dietary Guidelines for Americans. Details of the rationale for development of the HEI-2005 and its scoring system as well as evaluation of its validity and reliability have been reported elsewhere.^{20,22}

The HEI-2005 assesses diets on a density basis—that is, according to amounts of food groups (ie, the food groups and subgroups used in the USDA Food Patterns) and nutrients consumed per 1,000 calories, rather than on the basis of the absolute amounts consumed; therefore, the quality rather than quantity of foods consumed is assessed. Nine components of the HEI-2005 address dietary adequacy: Total Fruit, Whole Fruit, Total Vegetables, Dark Green and Orange Vegetables and Legumes, Total Grains, Whole Grains, Milk, Meat and Beans, and Oils. The remaining 3 components assess Saturated Fat; Sodium; and Calories From Solid Fats, Alcoholic Beverages, and Added Sugars, all of which should be consumed in moderation. For the adequacy components, higher scores reflect higher intakes. For the moderation components, higher scores reflect *lower* intakes because lower intakes are more desirable. For all components, a higher score indicates a higher quality diet. The total HEI-2005 score is the sum of the component scores. The HEI-2005 component and total scores for each participant's entry and exit recalls were calculated using the variables described above and published algorithms.²⁰

Data Analysis

The characteristics of the sample were described by calculating the percent distributions for age, race/ethnicity, pregnancy/lactation status, and state

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