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Should Physical Activity Be Included in Nutrition Education? A Comparison of Nutrition Outcomes With and Without In-Class Activities

Abstract

Limited-resource adults' dietary intakes and nutrition behaviors improve as a result of Expanded Food and Nutrition Education Program (EFNEP)/Supplemental Nutrition Assistance Program Education (SNAP-Ed) participation; however, physical activity education is needed for improved health. The experimental study reported here assessed if spending time doing physical activity education affected dietary impact results and activity among participants. Standard dietary assessments showed no significant differences between groups, and interviews showed greater physical activity improvements/intentions by the experimental group, which suggests that nutrition education can be shortened 15-20 minutes for physical activity demonstrations to improve activity behaviors without adversely affecting nutrition-related behavioral improvements outcomes.

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Introduction

The United Stated Department of Agriculture (USDA) maintains a commitment to improving individuals' dietary behaviors through nutrition education offerings consistent with the Dietary Guidelines for Americans. Since the 1960's, the USDA's National Institute of Food and Agriculture (formerly the Cooperative State Research, Education and Extension Service) has provided nutrition education to limited-resource families through the Expanded Food and Nutrition Education Program (EFNEP) (USDA, 2009a). In 1988, the USDA's Food and Nutrition Service extended provisions for nutrition education to those eligible for Supplemental Nutrition Assistance Program (SNAP; formerly Food Stamps) benefits (USDA, 2009b). In many states, both EFNEP and SNAP-Education (Ed) employ paraprofessional educators to model "positive nutrition, health, and food safety behaviors" (Baker & Pearson, 2010; Baker, Pearson, & Chipman, 2009) and to engage program participants in interactive food shopping,

food safety, and food preparation lessons and to promote physical activity (USDA, 2008b; 2011). Both EFNEP and SNAP-Ed have demonstrated improvement in participants' fruit, vegetable, and dairy food intake and their intentions to engage in healthy dietary and exercise behaviors as a result of these nutrition education programming (USDA, 2008a; 2008b; Koszewski, Sehi, Behrends, & Tuttle, 2011).

Still, the prevalence of obesity among the SNAP-Ed/EFNEP target population, i.e., low-income audiences, continues to increase. In fact, a paradoxical relationship, wherein those who are the least food secure have the highest rates of obesity, has been identified (Dinour, Bergen, & Yeh, 2007). Martin and Farris (2007) found that those who are food insecure are nearly two and a half times more likely to be obese than are those who are food secure.

As the evidence that obesity, diet, and exercise are "inextricably intertwined" has grown (Brooks, Butte, Rand, Flatt, & Caballero, 2004), the Dietary Guidelines have increasingly recommended that physical activity should balance dietary intake as a means of reducing risk for obesity (USDA and DHHS, 2010). Also, in 2008, the Physical Activity Guidelines for Americans were published for the first time with concurrent recommendations that adults engage in 30 minutes of moderate-intensity exercise most days of the week (US Department of Health and Human Services [DHHS]). Of primary concern is that, in addition to disproportionately high rates of obesity among the low-income adults, low socio-economic status has also been associated with little or no leisure-time physical activity. This has, in part, been attributed to a multitude of interpersonal and community level barriers, for example, a lack of money, childcare, gyms, and/or transportation for exercising at gyms; safe neighborhoods and consistently pleasant weather for exercising outdoors; and equipment and space for exercising at home (Fitzgerald & Spaccarotella, 2009; Palmer & Ryan, 2008; Bennett et al., 2007). Despite this preponderance of evidence that supports the need for physical activity education among low-income individuals, the integration of physical activity into SNAP-Ed/EFNEP adult classes has been limited, and curricula that does address activity has largely remained knowledge-based, a less effective paradigm (Marcus et al., 2006; Contento et al., 1995).

SNAP-Ed/EFNEP impact studies have demonstrated that a minimum of six behaviorally focused nutrition education classes (traditionally 1 to 2 hours per week), are needed to promote behavior change in nutrition (Luccia, Kunkel, & Cason, 2003; Hoerr et al., 2011). Similarly, anecdotal data regarding an intervention in which SNAP-Ed/EFNEP adult classes offered behaviorally focused physical activity education for approximately 15 minutes per class over six classes suggested that (like nutrition education findings) a minimum dose of two to four exposures to the intervention were needed before the effect on exercise behavior could be measured.

Both nutrition and physical activity education are important to improving the health of limited resource individuals. Yet to produce measureable results, it is clear that in both these areas educational endeavors require behaviorally focused education offered over multiple class offerings. As such, nutrition and physical activity educational offerings may compete for the same educational time and resources. The investigation reported here sought to answer the question: If EFNEP and SNAP-Ed adult nutrition education classes are reduced by 15-20 minutes for the provision of physical activity education, are participants' nutrition-related behavior changes and nutritional outcomes affected?

Methods

The investigation was part of a larger quasi-experimental research project involving 21 EFNEP and SNAP-Ed adult classes recruited in nine out of a possible 19 counties served in New Jersey (NJ). All classes were held at least 1 hour per week for 6 weeks and consisted of an intact group of program participants who were assigned to either a control or experimental (intervention) group. Towards the end of the study period, classes were oversampled in the experimental group to increase the sample size of participants exposed to all six segments of the physical activity intervention. The research protocol was approved by the Rutgers Office of Research and Sponsored Programs Institutional Review Board (IRB Protocol #09-226M).

Sample

To be included in the study, class participants had to be between 18 and 55 years. No one was excluded because of gender, race/ethnicity, or willingness to exercise during class.

Intervention

Traditional NJ SNAP-Ed/EFNEP nutrition education programming was offered to both the control and experimental groups (www.njsnap-ed.rutgers.edu); however, class activities were reduced by 15-20 minutes in each of the experimental classes to allow for the integration of the physical activity portion of the intervention. The activities that were deleted were left to the discretion of the educator, based on class members' nutrition education needs (as is the case more globally for the nutrition education curricula offered to each class).

The physical activity intervention was offered using a digital video disc (DVD) entitled *Walk Indoors!* This DVD had been designed according to the literature of exercise DVDs; SNAP-Ed Plan Guidance; and national physical activity guidelines, which recommend walking for people of all fitness levels (DHHS, 2008). The DVD contains six, 15-minutes video segments, featuring a fitness expert safely leading a diverse cast, including SNAP-Ed/EFNEP staff, in low-impact, moderate-intensity physical activity. Five segments are aerobic walking demonstrations with varying fitness themes, and one segment is stretching. The DVD was previously tested in NJ SNAP-Ed/EFNEP adult classes in 2009-2010, and its effect on exercise behaviors bode well for its use among limited-resource, diverse adults.

Data Collection

Data used were primarily derived from surveys paraprofessional educators administered as part of their usual practice. These were: demographic survey questions; standardized Nutrition Behavior Checklist questions, 24-hour food recall results; and, class sign-in sheets (www.njsnap-ed.rutgers.edu).

The Nutrition Behavior Checklist

Nutrition-related behaviors were assessed with NJ SNAP-Ed and EFNEP program participants, pre- and post-intervention, using the EFNEP 10-item checklist (Hoer et al., 2011). This instrument includes nutrition, food resource management, and food safety questions. Responses use a 5-point Likert-type scale, ranging from one, "Do Not Do," to five, "Almost Always [Do]." It has been found easy to administer in group settings; to have a 4.0 Flesch-Kincaid readability score and low participant

response burden; and to be reliable and sensitive to change among low-income, minority women (Townsend, Kaiser, Allen, Joy, & Murphy, 2003).

1-Day Food Recalls

To estimate short-term food group consumption, pre- and post- 24-hour food recalls were performed using a derivative of the USDA's multiple-pass method found to maximize memory capabilities to achieve recall accuracy (Conway, Ingwersen, & Moshfegh, 2004; Conway et al., 2003; McClelland et al., 2001). The multiple-pass method requires educators to first ask participants to make a quick list of all the foods they consumed before class, working backwards 24 hours. Next, participants are asked to recall snacks and beverages. Then, participants review their lists for anything they may have missed and are asked to add descriptive detail, such as ingredients, brand names, condiments, and preparation methods. To improve estimates of serving sizes, the educators provide participants with models. Then, the educators review the participants' recalls for completeness and to ask for clarification of any entry. Fidelity to this method, and therefore the data collection protocol for this investigation, was maintained by the NJ SNAP-Ed/EFNEP staff. Only the amount of one-on-one assistance varied depending upon the size of class being managed.

Statistical Analysis

SNAP-Ed/EFNEP staff processed all participants' socio-demographic and dietary recall data using the Nutrition Education Evaluation and Reporting System (NEERS) SRS5 Software (University of Georgia, 2008) to produce personalized summaries, including estimated and recommended dietary intakes of kilocalories and food groups per day. NEERS5 recommendations are based upon self-reported gender, age, height, weight, and activity level matched to one of 14 USDA food patterns (USDA, 2011). If any of these data were missing, recommendations were based upon a 2000 kilocalorie per day diet for the average EFNEP participant, that is, a female, 19-25 years old who exercises <30 minutes per day (NEERS5 Diet Summary Committee, 2006). Data gleaned from these diet summary reports, behavior checklists, and demographic survey data were used for nutrition-related behavior and nutrient intake analyzes. One question was added to qualitatively capture the changes participants said they had made as a result of nutrition education programming.

Descriptive findings were reported as frequencies and percents. Pre-post-intervention change in nutrition behaviors were examined as means with standard deviations of estimated dietary intakes and changes in intakes by food group. Analysis of Variance was used for hypothesis testing, that is, between group differences. To identify the expected error in these results, a power calculation was performed based upon the total number of Program graduates (1162) during the study period (http://www.raosoft.com/samplesize.html). Unless otherwise stated, these analyses were performed using SAS v 9.1 (Cary, NC) with significance set at $p<0.05$. Qualitative data were analyzed for themes by group.

Results

Although 255 participants attended the classes examined, only 53 participants were included in the analyses due to class attrition prior to post-testing (61%) and the elimination of those with missing

values (18%). There were 17 subjects in the control group and 36 in the experimental group. No significant differences in socio-demographic variables were found between these groups. Although data regarding five racial categories were collected, no participants classified themselves as Native American/Alaskan, Asian, or Hawaiian/Pacific Islander. More than half of the participants were non-white females under the age of 26 who lived alone and received incomes below the poverty thresholds for individuals. See Table 1.

Table 1.

Descriptive Characteristic by Intervention Group

	Study Sample			
	Control		Experimental	
Socio-demographic Variable	**n**	**%**	**n**	**%**
Gender (n=53)				
Male	11	65%	12	33%
Female	6	35%	24	66%
Ethnicity (n=28)				
Hispanic	0	0%	4	20%
Non-Hispanic	8	100%	16	80%
Race				
African-American	10	63%	18	62%
White	6	37%	11	38%
Education (N=50)				
No High School Diploma or General Equivalency Diploma (GED)	3	19%	4	11%
GED	3	19%	7	21%
High School Diploma	5	31%	4	11%
Some Post-secondary Education	0	0%	8	24%
Technical School	1	6%	6	18%
2 Year Degree	2	13%	5	15%
4 Year Degree	1	6%	0	0%
Post Secondary Education	1	6%	0	0%
*Significant ($\alpha > 0.05$)				

A 13.2% error could be expected in the following results. As is denoted, negative change, or poorer mean results associated with behaviors post intervention than pre, was evident on three behaviors for

the control group and two for the experimental group. This is not uncommon, because as learning occurs, responses become more educated. For example, while pre intervention a cup of coffee may be considered to be "breakfast," post intervention it may not. However, between the intervention groups, only two significant differences were found among the nutrition-related behavior change differences, i.e., participants in the experimental group did more poorly post-intervention with regards to thawing foods at room temperature significantly less often and the control group exhibited far less positive change with regards to reading Nutrition Facts labels. See Table 2.

Table 2.

Behavior Checklist and Change in Nutrition Behavior by Intervention Group

Behavior Checklist Question	Control Group Mean Change ±SD	Experimental Group Mean Change ±SD	p-value
1. How often do you plan meals ahead of time?	-0.3±1.2	0.3±1.2	0.11
2. How often do you compare prices before buying food?	0.1±1.6	0.3±1.5	0.72
3. How often do you run out of food before the end of the month?	0.2±1.2	0.0±1.0	0.55
4. How often do you shop with a grocery list?	0.4±1.4	0.6±1.4	0.68
5. How often do you let meat or dairy foods sit out for more than 2 hours?	0.2±0.9	0.2±0.9	0.93
6. How often do you thaw frozen foods at room temperature?	0.1±1.0	-0.9±1.6	0.04*
7. When deciding what to feed your family, how often do you think about healthful food choices?	0.5±1.4	0.2±1.4	0.61
8. How often do you prepare foods without adding salt?	0.7±0.8	0.2±1.6	0.75
9. How often do you use the "Nutrition Facts" on the food label to make food choices?	-0.2±0.8	0.6±1.4	0.03*
10. How often do your children eat something within 2 hours of waking?	-0.2±0.9	-0.2±1.7	0.98
*Significant (α > 0.05)			

Diet recall analyses revealed that while the control group evidenced improved intake of fruits and

vegetables, and the experimental group evidenced increased intake of fruits and dairy foods, no significant food group differences in their changes were found. See Table 3.

Table 3.

Food Group Intake

Food Group	Control Group Dietary Intake			Experimental Group Dietary Intake		
	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Mean Change	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Mean Change
Fruits (cups)	1.4 + 1.2	1.5 + 1.8	+ 0.1	1.0 + 1.5	1.3 + 1.3	+ 0.3
Vegetables (cups)	1.4 + 1.2	1.5 + 0.9	+ 0.1	2.1 + 1.8	1.4 + 1.3	- 0.7
Grains (ounce equivalents)**	8.6 + 4.7	6.5 + 3.3	- 1.5	7.6 + 8.4	5.5 + 4.0	- 2.1
Proteins (ounce equivalents)**	7.2 + 4.3	5.7 + 4.2		7.3 + 4.7	6.9 + 3.7	- 0.4
Dairy (cups)	1.6 + 1.2	1.5 + 1.5	- 0.1	1.2 + 1.0	1.3 + 1.2	+ 0.1

**per www.nutrition.gov
*Significant (α > 0.05)

Participants responded to the open-ended question, "Since you have taken this class, have you made any changes, or are you thinking about doing anything different, that is, thinking about making a change?" with both nutrition- and exercise-related intentions as the question was designed. The only notable difference between groups was that plans to exercise were stated more often among members of the experimental groups.

Discussion

Since 2005, the Dietary Guidelines for Americans have included clear recommendations for exercise to balance dietary intake and improve health. In order to maintain consistency with these Guidelines, USDA-funded nutrition education programs need to increase offerings of behaviorally focused physical activity lessons in all classes, including those for adults. The investigation reported here examined the effects of the inclusion of 15-20 minutes of moderate-intensity, physical activity demonstrations in NJ SNAP-Ed/EFNEP classes via an exercise DVD designed specifically for limited-resource, diverse audiences. Of primary concern for SNAP-Ed and EFNEP stakeholders is the impact of such offerings on program efficacy.

The preliminary investigation, which reached the intended target audience, that is, those who were primarily young, minority women receiving SNAP benefits, showed that a comparison of the nutrition

changes between participants in classes with and without the demonstrations failed to identify any harmful effect on salient nutrition behavior changes. There were no significant differences between the control and experimental groups in mean changes of dietary intake from any of the five food groups. Additionally, the findings reflected the national reports that SNAP-Ed/EFNEP participants improved their intake of foods from the fruit, vegetable, and dairy groups (USDA, 2008a; 2008b; 2013). For example, both intervention groups showed improvements in mean servings from two of these three food groups.

Interestingly, the findings from the analyses of the Nutrition Behavior Checklists showed participants in the experimental group were more likely than participants in the control group to change certain food shopping and safety behaviors. These are likely due to the small sample size and should be further examined to eliminate the possibility of these being false positive results.

Of significance are the results of the open-ended question. Those who received the physical activity intervention said they intended to exercise "more" and in particular "walk" more. According to the 2008 Physical Activity Guidelines, a large body of research has shown community-level walking interventions improve participants' self-efficacy to engage in regular exercise, as well as being the easiest and safest activity with health benefits to all regardless of age, gender, race/ethnicity, and physical fitness levels (DHHS, 2008; Isaacs et al., 2007; . et al, 2007; Eyler, Brownson, Bacak. & Housemann, 2003). The findings from the investigation further support walking demonstrations as a strategy to promote moderate-intensity physical activity in federally funded nutrition education programs because the activity can be performed in class by existing staff and existing resources.

The investigation reported here was not without challenges typical to intervention research. The participant attrition rate and short study period weakened the results. To overcome these limitations, longitudinal research in multiple states using more novel practices that promote physical activity among limited-resource, diverse adults are needed. Advances in the literature such as the investigation reported here will improve current methodologies, which compete for the same educational time and resources.

The investigation supports the notion that the institutionalization of behaviorally focused physical education in SNAP-Ed and EFNEP adult classes augments, rather than detracts from, these programs' documented dietary improvement outcomes. Ultimately, the inclusion of physical activity education in the programs will contribute to the USDA's long-term priority to prevent obesity by improving the nation's nutrition and health.

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