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An Evaluation of Nutrition Education Program for Low-Income Youth

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Abstract: A quasi-experimental design consisting of pretest, posttest, and delayed posttest comparison control group was used. Nutrition knowledge and behaviors were measured at pretest (time 1) posttest (time 2) and delayed posttest (time 3). General Linear Model (GLM) repeated measure ANCOVA results showed that youth who received nutrition education lessons significantly improved their nutrition knowledge and nutrition behaviors compared to those who did not participate in the lessons.

Introduction

The Expanded Food and Nutrition Education Program (EFNEP) is federally funded through the U.S. Department of Agriculture National Institute of Food and Agriculture (NIFA) and strives to improve the health of low-income families (children, youth, and families with young children) attain healthy eating and

lifestyle practices (United States Department of Agriculture [USDA], 2009). The Pennsylvania State University Cooperative Extension Program delivers research-based information and nutrition education in the home, in the classroom, and in community group settings to help Pennsylvanians with limited financial resources make better nutrition and health decisions. At Penn State, the Expanded Food and Nutrition Education Program (EFNEP) provides nutrition education to low-income youth as an enrichment of the school curriculum, in afterschool care programs, through 4-H EFNEP clubs, day camps, community centers, and neighborhood groups (CSREES, 2009). In the fall of 2008 in Clearfield County, Penn State Nutrition Links EFNEP program implemented a new curriculum entitled *Up for the Challenge: Health, Fitness, and Nutrition*, developed by the University of Maryland Extension that reflects the most current nutrition and health guidelines.

The *Up for the Challenge: Health, Fitness, and Nutrition* curriculum was designed based on experiential learning model that is structured around direct participation: experiencing, thinking, discussing, and applying what the youth have learned to their daily lives. The curriculum includes nutrition information on MyPyramid, food descriptions, food identification, food preparation skills, and calories intake. The lessons provide expected youth outcomes, instructor's essential information, preparation instructions, supplies, lesson time, handouts, and opportunities for reflection. The overall goal of the curriculum is to promote healthful nutrition knowledge and behaviors with low-income youth.

Although many nutrition education programs have been designed and evaluated, relatively few have emphasized the use of an experiential learning approach in implementing curriculum-based nutrition education in afterschool programs. Other studies have used experiential learning as a framework for developing and implementing garden-based nutrition learning programs (Desmond, Grieshop, & Subramaniam, 2004), some of which have been shown to be effective at improving the nutrition knowledge and behaviors of school students (Morris, Koumjian, Briggs, & Zidenberg-Cherr, 2002). However, there remains insufficient information on implementing curriculum-based nutrition education lessons using an experiential learning approach with low-income youth in afterschool settings. Overweight is greatest among the low-income groups than other groups (Morton and Guthrie, 1999; Wang, 2001). There is a need to assess effectiveness of nutrition education programs, and replicate studies in other afterschool programs.

Purpose

The purpose of the study reported here was to evaluate whether selected nutrition education lessons from the *Up for the Challenge: Health, Fitness, and Nutrition* curriculum can change knowledge and behaviors about nutrition with low-income youth in afterschool programs.

Methodology

Five nutrition education lessons from the *Up for the Challenge: Health, Fitness, and Nutrition* curriculum were identified for use in the program. The lessons were taught to youth to change knowledge, enhance skills, and make healthy food choices via experiential learning activities that included food tasting, food art, food puzzles, games, identification of fruit and vegetables, and preparation of healthy snack.

A quasi-experimental design consisting of pretest-posttest-delayed posttest comparison control group was used. Two afterschool programs were categorized into treatment (TG) and control group (CG). Youth receiving nutrition education lessons through Penn State Nutrition Links-Expanded Food and Nutrition Education Program (EFNEP) were identified to participate in the treatment group. Overall, a total of 86 youth participated in the study, (treatment=43, and control=43). Nutrition knowledge and nutrition behaviors were measured at pretest (time 1), posttest (time 2), and delayed post-posttest (time 3) for follow-up after two

weeks.

A three-part evaluation tool was developed to collect data. The tools were developed to reflect the content of the five nutrition lessons based on lesson objectives/outcome described in the Up for the Challenge: Health, Fitness, and Nutrition curriculum. Part one contained 11 questions pertaining to general nutrition knowledge. Questions were measured using multiple choices and yes or no format. Part two contained seven questions on nutrition behaviors. Statements were measured using a four-point scale that ranged from 1 = never to 4 = several times a day. Part three contained demographic questions such as gender, age, grade level, and ethnicity.

A panel of experts (two nutrition education specialists and three faculty members at The Pennsylvania State University) reviewed the questionnaire for content and face validity. A pilot test was conducted using youth not included in the study to estimate instrument reliability. All the parts of the questionnaire had acceptable reliability. Cronbach's alpha for the final study ranges from .68 (Nutrition knowledge) to .60 (Nutrition behaviors).

Pretest data on nutrition knowledge and nutrition behaviors for both the treatment and control groups was collected first at the same time. Two-three hours hand-on nutrition education lessons were taught to youth in the treatment group every week over a 4-week period, after which posttest data was collected, followed by delayed posttest data for both groups after two weeks. The control group did not receive any nutrition lessons. Each questionnaire was labeled and given an identification letter for easy data entry and analysis. Data from the treatment and control groups were examined for equivalence.

Data were entered and analyzed using a Statistical Package for Social Sciences (SPSS) version 17.0 for windows vista 2007; Chicago, IL. Descriptive and inferential statistics were used to summarize data. Descriptive statistics included means and standard deviations. Inferential statistics included General Linear Model repeated measure ANCOVA.

Results

A majority of youth in the treatment group were male (55.8%), while a majority in the control group were female (58.1%). The age of youth ranged from 10-14 years, with 40% between ages 10 and 11 in the treatment group, and 11 and 12 in control group. Almost 49% of the youth were in fifth grade, followed by sixth grade (23.3%) for the treatment group, while in the control group approximately 37.2% of youth were in sixth grade, followed by seventh grade (34.9%). All youth, both in treatment and control groups, were white.

Nutrition Knowledge Assessment

General linear model (GLM) repeated measures analysis of covariance (ANCOVA) was performed with posttest and delayed posttest nutrition knowledge scores as factors and pretest nutrition knowledge scores as a covariate. Sphericity assumption (of covariance matrix) using Mauchly's test were not met; significant value was $<.05$. Therefore, F-value of Greenhouse-Geisser was used to determine level of significance. Results indicated a significant increase in nutrition knowledge [F (1.000, 83.00) = 10.12, $p < .001$] from posttest to delayed posttest when controlling for pretest knowledge scores, and nutrition knowledge increased regardless of the group [F (1.000, 83.00) = 19.37, $p < .001$]. However, increase in nutrition knowledge co-varies with pretest nutrition knowledge of youth [F (1.000, 83.00) = 4.819, $p < .05$] but the covariate (pretest nutrition knowledge) has no significant effect [F 1, 83) = .57056, $p > .05$] on the increase in nutrition knowledge scores (Table 1).

Table 1.

Repeated Measure ANCOVA Comparing Posttest and Delayed Posttest Scores for Nutrition Knowledge^a with Pretest Scores as a Covariate

	Group	Adjusted Means	Std Error		
Post-test	Treatment	8.747	.223		
	Control	5.741	.223		
Delayed posttest	Treatment	9.968	.238		
	Control	5.544	.238		
Source of variation	df	SS	MS	F	p(sig)
Posttest, delayed (factor 1)	1.000	7.767	7.767	10.12	<.001
Factor 1 by covariate (pretest knowledge)	1.000	3.703	3.703	4.819	.031
Factor 1 by group (treatment & control)	1.000	14.88	14.88	19.37	<.001
Error (factor 1)	83.00	63.78	.768		
Covariate (pretest knowledge)	1	168.62	168.62	57.056	.101
Group	1	408.46	408.46	138.22	<.001
Error	83	245.29	2.955		
^a scores range from 0 to 11 Knowledge measured by multiple choice, yes/no format					

Nutrition Behavior Assessment

General linear model (GLM) repeated measures analysis of covariance (ANCOVA) was performed with posttest and delayed posttest nutrition behavior scores as factors and pretest nutrition behavior scores as a covariate. Sphericity assumption (of covariance matrix) using Mauchly's test were met; significant value was >.05. Therefore, F-value for Sphericity Assumed was used to determine level of significance. Results indicated a significant increase in nutrition behavior scores [F (1, 83) =3.290, *p*<.001] from posttest to delayed posttest, and nutrition behaviors increased [F (1, 83) =55.34, *p*<.001] regardless of the group. However, the increase in nutrition behavior co-varies with pretest nutrition behaviors of youth [F (1, .83) =.921, *p*<.05] but the covariate (pretest nutrition behavior) has no significant effect [F 1, 83) =.54.76, *p*>.05) on the increase in nutrition behaviors (Table 2).

Table 2.

Repeated Measure ANCOVA Comparing Posttest and Delayed Posttest Scores for Nutrition Behavior^b with Pretest Behavior Scores as a Covariate

	Group	Adjusted Means	Std Error		
Post-test	Treatment	16.93	.226		
	Control	12.51	.226		
Delayed posttest	Treatment	19.11	.224		
	Control	12.47	.224		
Source of variation	df	SS	MS	F	p(sig)
Pretest, posttest, delayed (factor 1)	1	4.300	4.300	3.290	<.001
Factor 1 by covariate (pretest behaviors)	1	1.204	1.204	.921	.034
Factor 1 by group (treatment & control)	1	46.19	46.19	35.34	<.001
Error (factor 1)	83	108.49	1.307		
Covariate (pretest behaviors)	1	151.02	151.02	54.76	.113
Group	1	1144.75	1144.75	415.07	<.001
Error	83	228.91	2.758		
^b scores could range from 7 to 28 Behavior measured on scale (1) Never, (2) 2-3 times/week, (3) once/day, (4) several times a day					

Discussion

The nutrition knowledge scores for the youth participating in nutrition education lessons from the Up for the Challenge curriculum significantly increased from pretest to posttest and delayed posttest compared to youth in the control group. Previous research has shown an increase in knowledge after nutrition education intervention among youth in afterschool programs (Kelder, Hoelscher, Barrosa, Walker, Cribbs, & Hu, 2005; Kelder, Michell, McKenzie, Derby, Strikmiller, Luepker, et al., 2003). Also, a quasi-experimental study conducted by Rabe, Ohri-Vachaspati, and Scheer, (2006) found that youth participating in EFNEP significantly increased nutrition knowledge compared to the control group. Nutrition behavior scores of youth increased significantly from pretest to posttest and delayed posttest compared to the control group. The findings concur with findings of Powers, Struempfer, Guarino, and Parmer (2005), who found that children participating in nutrition intervention curriculum (dairy consumption, fruits and vegetable consumption, food guide pyramid knowledge) exhibited significantly greater improvements in overall nutrition behavior than the children in the control group.

Conclusions and Recommendations

Overall, the findings show that there was program effect on the treatment group. The significant improvement for nutrition knowledge and nutrition behavior scores indicated that the five nutrition education lessons from the Up for the Challenge: Healthy Fitness, and Nutrition curriculum can be used to change youths' knowledge and behaviors regarding nutrition. The findings also demonstrates that implementing curriculum-based nutrition education lessons using a hands-on, experiential learning approach for youth in afterschool program can have immediate effect on youths' nutrition knowledge and behaviors.

Further testing of the nutrition education lessons from the Up for the Challenge: Healthy Fitness, and Nutrition curriculum with a diverse group of youth is very important given the fact that as all youth were of a single ethnicity.

Parents should be involved in nutrition education programs through active participation and information exchange in relation to their child's nutrition needs and healthy habits. In addition, nutrition education materials should be shared with parents so that they can reinforce the information at home for good nutrition practice and healthy habits.

Finally, further research should include qualitative questions in the evaluation process to provide opportunity for youth to express themselves fully on particular nutrition issues.

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