Assessing the Feasibility of a Service Learning Activity to Promote Nutritional Knowledge and Behavior

Sean A. Forbes [1]
College of Education, Auburn University, United States

M. C. Kate Esposito [2]
College of Education, California State University, United States

Rebecca Robichaux-Davis [3]
College of Education, Mississippi State University, United States

Anthony J. Guarino [4]
MGH Institute of Health, United States

Abstract

This one group pre/post study assessed the feasibility of a newly created nutritional course for sixth-grade students from impoverished schools. The sample (N = 512) was comprised of students from the western and southeastern United States. Surveys assessing nutritional knowledge and appropriate diet consumption were completed before and one-week after the end of the course. Pre-service teachers enrolled in their service-learning activity conducted five-nutrition classes (one day per week) on the following topics, (a) The Body & Nutrients, (b) Understanding Food Labels, (c) Food Pyramid Servings, (d) Calorie Intake, and (e) Healthy Eating Goals. The results indicated a dramatic increase in Knowledge yet no gain on Behavior. Implications of these findings are discussed.

Keywords: *Nutrition, middle-school health education, service learning, pre-service teachers*

INTRODUCTION

Childhood obesity has more than doubled in children and quadrupled in adolescents in the past 30 years (Briefel & Johnson, 2004). The percentage of children aged 6–11 years in the United States who were obese increased from 7% in 1980 to nearly 18% in 2010 (Reedy & Krebs-Smith, 2010). Similarly, the percentage of adolescents aged 12–19 years who were obese increased from 5% to nearly 21% over the same period (McGuire, 2011). In 2012, more than one third of children and adolescents were overweight or obese (Ng, et al., 2014). A major contributing factor is improper nutrition; specifically foods high in fat and low in nutritional value (Reedy & Krebs-Smith, 2010). Eating a healthy breakfast is associated with improved cognitive function (especially memory), reduced absenteeism, and improved mood (Hoyland, Dye, & Lawton, 2009). By increasing consumption of low-fat dairy products, fruits, and vegetables and decreasing consumption of soft drinks; prevalence of these nutrition-related problems could be reduced (Smith, 2011). Because schools perform a critical role in the education of healthy eating, the faculty at the respective Colleges of Education elected "nutrition education" as the service-learning activity. The service-learning activity is designed for pre-service teachers to instruct topics important to the community. The schools involved were from impoverished areas and assigned the sixth grade to receive the "nutrition education." The primary purposes of this study were to assess the feasibility of a student-service activity designed to, (a) promote nutritional knowledge so as to (b) ensure students were in fact consuming an appropriate diet for sixth-grade students from impoverished schools.

METHOD

Participants

This study was a one-group pretest-posttest design (O X O) (William, 2002). The sample for this study was comprised of (N = 512) sixth-grade students from impoverishes schools (i.e., > 75% of the student-body received free or reduced-price meal plans). The schools were located in western and southeastern United States. No demographic information was obtained due to the strict confidentiality policies of the schools.

Development of the instrument

The Nutrition Knowledge Survey is a 25-item multiple-choice assessment tool to evaluate students' knowledge of nutrition. The items were derived from the U.S. Department of Agriculture (USDA) guidelines (McGuire, 2011). One example, *Citrus fruits are an excellent source of* __?, A) calcium, B) vitamin c, C) vitamin B, D) calories, E) Don't know. Student scores were the percent correct.

The Nutrition Behavior Survey recorded the consumed foods from the prior 24- hour period. A check list was developed of typically consumed foods for the students to check either "yes" or "no".   This allowed assessing changes in the student's eating patterns. This check list included health enhancing eating patterns, (i.e., 2½ cups to 6½ cups of fruits and vegetables and 2–3 ounces whole grains) and health-degenerating behaviors, (i.e., empty calories from added sugars in soda, fruit drinks, and baked desserts). It is instructive to note that only frequency and not amounts were recorded. Nevertheless, student scores were the recoded percent of the health enhancing items recommended by USDA.

Service learning program

Pre-service teachers enrolled in their service-learning activity conducted five-nutrition classes (one day per week) on the following topics, (a) The Body & Nutrients, (b) Understanding Food Labels, (c) Food Pyramid Servings, (d) Calorie Intake, and (e) Healthy Eating Goals. The students were assigned to groups of five with each student responsible for one of the topics. By having groups of five pre-service teachers conduct the nutrition classes, we were able to provide either a 3:1 or a 4:1 student teacher ratio. The classes were conducted during the students' nutrition break which allowed the pre-service teachers to model healthy eating choices.

Statistical analyses

All statistical tests were performed using IBM SPSS 22 (Chicago, IL). The N = 512 exceeded the recommendations for sufficient power. The *a priori* power analysis of .80 suggested a sample of 54 for a moderate effect with alpha set at set at $p < .05$ to achieve statistical significance. A 2 (time: pre/post) X 2 (outcome: Knowledge and Behavior) within-subjects ANOVA was conducted to determine the effects of the five pre-service teachers service-learning nutrition classes.

RESULTS

Findings about the validity of the scale

Results of the two-way within-subjects ANOVA indicated a statistically significant Time X Outcome interaction effect, $F_{(1, 511)}$ = 1879.41, $p < .001$, $\eta2$ = .79. Follow-up paired t-tests detected a statistically significant increase in Knowledge, $F_{(1, 511)}$ = 15405.93, $p < .001$, $\eta2$ = .97, however, Behavior failed to achieve significance, $F_{(1, 511)}$ = 1.50, p =.221, observed power = .23. The means and standard deviations for the pre and post outcomes are presented in Table 1.

Table 1. *Means and standard deviations of the pre and post Behavior and Knowledge scores*

	Behavior		Knowledge	
Time	M	SD	M	SD
Pre	36.44	13.39	47.58	8.12
Post	37.30	6.78	81.79	11.82

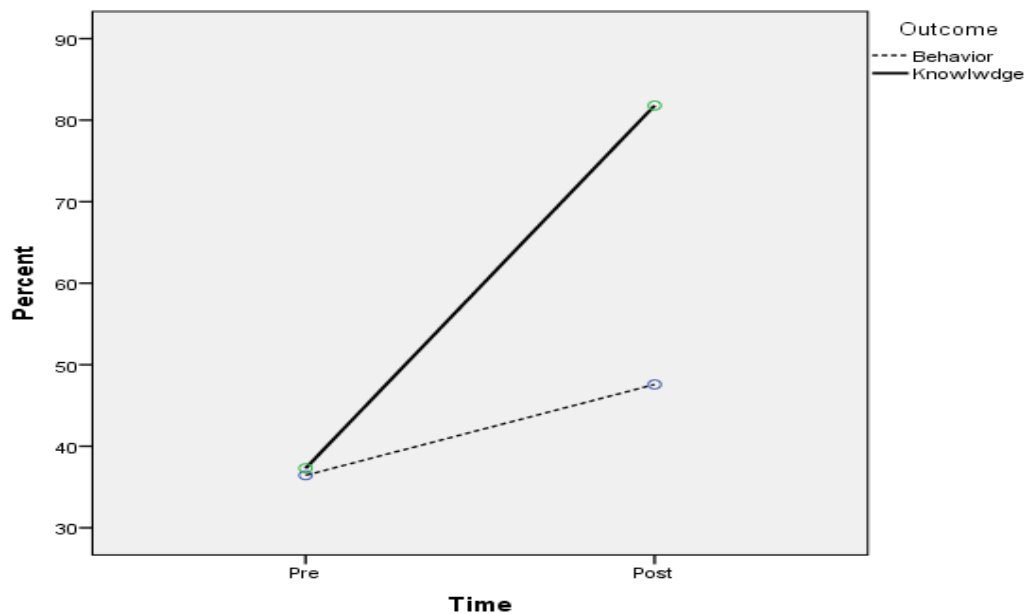The interaction effects are illustrated in the Figure 1.

Figure 1. *The slopes of the pre and post Behavior and Knowledge scores*

DISCUSSION

The results reflect the adage that what one knows is not necessarily what one actually does. This discrepancy is quite apparent in that *Knowledge* significantly increased by approximately 72% [(81.79 - 47.58)/ 47.58] yet the *Behavior* component increased by approximately 2% [(37.30 − 36.44)/ 36.44] a non-significant change. Analysis of *The Nutrition Behavior Survey* suggested that breakfast scored the poorest for consumed nutrition, M = 32.3% $\pm$ 4.72 followed by dinner, M = 41.3% $\pm$ 5.27. These results, along with anecdotal evidence, support the findings of Campbell, Crawford, & Ball (2006) that healthy food and beverage may not be available during those particular time-points. It appears that until nutrition education is extended to the caretakers as well as to the children, reducing obesity will be stymied.

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