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Piloting a Cooperative Extension Service Nutrition Education Program on First-Grade Children's Willingness to Try Foods Containing Legumes

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Abstract: Many nutrition education campaigns targeting children in the United States focus on increasing fruit and vegetable consumption, but most don't specifically promote legumes. The project described here sought to pilot the effect of an Extension nutrition education program on first grade children's willingness to try foods containing legumes. A significant difference was observed in the distribution of children who took snacks containing legumes from pre- to post- through follow-up education.

Introduction

Many nutrition education campaigns targeting children in the United States focus on increasing fruits and vegetables, but most do not specifically promote legumes. Legumes may have been overlooked because in the previous United States Department of Agriculture (USDA) Food Guide Pyramid legumes were in the meat, poultry, fish, beans, eggs, and nut group (USDA, 1992). In the current USDA MyPyramid legumes are in both the vegetable and meat and bean groups because they are a plant-based food like vegetables, but are also a good source of protein, like meat (USDA, 2005).

Legumes are a good source of protein, folate, potassium, iron, and magnesium, and research has shown children who eat legumes get more of these valuable nutrients than children who do not. In addition, legumes are low in fat and high in fiber (American Dietetic Association, 2006). Although legumes are nutrient rich and inexpensive, legumes are under-utilized in children's diets (Lucier, Lin, Allshouse, & Kantor, 2000).

The project described here sought to pilot the effect of an Extension nutrition education program, *The Story of Benny the Traveling Bean*, on first grade children's willingness to try foods containing legumes.

Program Description

The *Story of Benny the Traveling Bean* was created to educate children on health benefits of legumes, how legumes are used in foods, and history of legumes. The 16-page illustrated story follows Benny the Bean as he sprouts in Peru and travels around the world teaching others how to cook beans and about their health benefits. The book also includes separate chapters on health benefits of beans, bean recipes, and food safety tips.

Program Evaluation

The nutrition education program was pilot tested in a rural elementary school first grade class using a 3-week quasi-experimental pre-, post-, follow-up design. The project was approved by the Oklahoma State University Institutional Review Board for Human Subjects. Parents provided written informed consent and children provided verbal assent.

The nutrition education program took place during school in the first grade classroom, meeting once a week for 3 weeks. During the first and third weeks, children only participated in snack tasting. During the second week, the children sat at their desk and were read *The Story of Benny the Traveling Bean*. A Benny the Bean character was constructed and placed at the front of the room in a chair for children to see during the story. To ensure all children viewed the illustrations, the story was projected at the front of the room on a SMART board while read to the children. At the conclusion of the story, children participated in snack tasting.

Each week four snacks were provided, two containing legumes (Bean Quesadillas from Mexico and New England Bean Dip, both from *The Story of Benny the Traveling Bean*) and two not containing legumes (gold fish crackers and ham & cheese sandwiches). Before tasting, children were told the snack names and if they contained legumes. Each week three trained observers recorded the number of snacks containing legumes children took and the number of snacks containing legumes they tasted.

For each time period (pre-, post-, and follow-up), data were coded as "0" if the child did not take or taste a snack containing legumes, "1" if the child took or tasted one snack containing legumes, and "2" if the child took or tasted 2 snacks containing legumes. Only data from children present at all three time periods were included in the data analysis. Data were analyzed with Friedman test using PC SAS for Windows, Version 8 (SAS Institute, Cary, NC). Significance level was set at $p < 0.05$.

Results and Discussion

Fourteen children (five males and nine females) participated in the project. However, only 11 children (three males and eight females) were present at all three time periods.

A significant difference was observed in the distribution of children who took snacks containing legumes across the three time periods (Table 1). Although not significant, there was an increase in the number of children who tasted snacks containing legumes across the three time periods (Table 1).

Studies have shown that toddlers often need to be exposed to new foods repeatedly before accepting the food (Carruth et al., 1998). If the same is true for school age children, this may be reflected in the results of the project. The number of children willing to take and taste food containing legumes continued to increase from pre- to post- to follow-up, which could be a result of the "exposure effect."

A limitation of the project was the small sample size. In addition, the results of the project may have been affected by the choice of legume snacks offered. Some children did not like the onions and peppers in the Bean Quesadillas. Other foods containing legumes that could be used include chili, soup, refried beans, or casserole.

Table 1.
Number of Children Who Took and Tasted Legume Snacks Before, After, and Following a Legume Nutrition Education Program

	Children Taking Legume Snacks p = 0.048*			Children Tasting Legume Snack p = 0.142		
	0 legume snacks n (%)	1 legume snack n (%)	2 legume snacks n (%)	0 legume snacks n (%)	1 legume snack n (%)	2 legume snacks n (%)
Pre education	6 (55 %)	5 (45 %)	0 (0 %)	7 (64 %)	4 (36 %)	0 (0 %)
Post education	4 (36 %)	7 (64 %)	0 (0 %)	5 (45 %)	6 (55 %)	0 (0 %)
Follow-up education	2 (18 %)	7 (64 %)	2 (18 %)	4 (36 %)	5 (45 %)	2 (18 %)
*Significant difference in the distribution of children taking legume snacks across the three time periods, p ≤ 0.05.						

Implications

The results of the project described here indicate nutrition education programs promoting legumes can have a positive effect on first grade children's willingness to try foods containing legumes. Besides a classroom setting, Extension educators could use the program with audiences at libraries, 4-H cloverbuds, or parenting programs. Additional lessons and activities, such as the Cooking with a Chef curriculum, which incorporated legumes into cooking lessons, could be included to further enhance children's willingness to consume foods containing legumes by providing repeated exposure to and variety in foods containing legumes (Condrasky, 2006).

A copy of *The Story of Benny the Traveling Bean* is located at each county office in the southeast district of the Oklahoma State University Cooperative Extension Service. Another children's book, *One Bean* (Rockwell & Halsey, 1999) could be used as a substitute for *The Story of Benny the Traveling Bean* (Rockwell, 1999). This book is appropriate for first grade students and reveals the complete life cycle of a bean as the child character grows it, picks it, and eats it. *One Bean* is available at <<http://www.amazon.com>>.

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