



**February 2010**  
**Volume 48 Number 1**  
**Article Number 1IAW6**

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# **Using Education, Exposure, and Environments to Increase Preschool Children's Knowledge About Fruit and Vegetables**

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**Abstract:** Because children's eating habits predict their adult eating habits, educating children about healthy foods is essential (U.S. Department of Health and Human Services, 2000). A Midwest Extension Service created and delivered an educational experience for preschool children to increase knowledge of fruits and vegetables. The knowledge assessment scores (range of 0 to 7) increased from 3.5 ( $\pm$  1.8) to 5.9 ( $\pm$  1.9) ( $p$  < 0.001,  $n$  = 19) following the program. Analysis concluded that the children learned about fruits and vegetables through this experience. Other educators can readily adapt the program for a range of age groups and settings.

## Introduction

The Healthy People 2010 report (2000) has illustrated that establishing healthful dietary and physical activity habits during childhood is important for good health and well-being, and improves the likelihood of maintaining healthful habits throughout adulthood. Extension professionals are in a key position to initiate community programs to encourage healthful habits (Dart, Frable, & Bradley, 2008). The Healthy People 2010 report indicates that nutrition education, nutritious food choices, and modified environments in schools are necessary to achieve long-term success in modifying children's eating behaviors.

Parent nutrition knowledge has been identified as an indicator of fruit and vegetable intake (Gibson, Wardle, & Watts, 1998), and nutrition knowledge among school-age children has been measured (Nemet, Perez, & Reges, 2007). However, limited research has reported knowledge gain by preschool-age children as a result of nutrition education. In Spring 2008, a comprehensive educational experience was created for preschool children to increase knowledge and consumption of fruits and vegetables. It was delivered by Extension and facilitated by child care center staff. The multi-dimensional program created a unique and effective nutrition education experience and can be readily adapted and utilized by other educators.

## Program Description

A nutrition education program was offered by Extension at a large, public Midwest University. Preschool children, aged 3 to 5 years, participated in the program (n = 19). The program included three key components:

- **Education:** to emphasize the importance of choosing healthful foods
- **Exposure:** to introduce new fruits and vegetables on the child care center menu
- **Environment:** to provide continual support and dialogue that encouraged child development, including knowledge and acceptability of new fruits and vegetables

Each component was considered important to provide preschool children with a comprehensive educational experience about the importance of choosing to eat healthful foods such as fruits and vegetables.

## Education

During the 4-week program, four 30-minute lessons were held on a weekly basis to introduce six fruits and vegetables: blueberries, raspberries, kiwi, jicama, squash, and sugar snap peas. These fruits and vegetables were considered new to participants, because they had not previously been served to the children by the child care center.

Consistent with Robinson's (2004) recommendation, the lessons emphasized the health benefits of fruit and vegetables and did not introduce bodyweight implications. The Color Me Healthy! curriculum (Dunn, Thomas, Pegram, Ward, & Schmal, 2004) was adapted for the lessons and set the theme, "Have a Wagon Full of Fun." The lessons included discussion about how the participants could "fill" their imaginary wagon with healthy foods. The children engaged in dialogue, song and dance, coloring and drawing, and food recognition to learn about characteristics of the six fruits and vegetables. According to Cason (1999),

innovative and interactive strategies such as these encourage good nutrition in children.

At the fourth and final education lesson, the children used photographs of fruits and vegetables to actually "fill" an interactive wagon poster (Figure 1). The poster remained in the classroom throughout the duration of the program so that the children could continually play and recall the fruits and vegetables introduced during the education lessons.

**Figure 1.**  
The Wagon Poster Allowed for Continual Interactive Play and Learning



## Exposure

Providing continual access to a variety of healthful foods may lead to long-term healthful behavior change in children (Robinson, 2004). Throughout the program, at least one of each of the six new fruits and vegetables was provided during breakfast, lunch, and snack at the child care center. Each new fruit or vegetable was offered eight times over the duration of the 4-week program. The children were encouraged but not required to eat the fruits and vegetables.

## Environment

Throughout the program, the children discussed the fruits and vegetables with their teachers and were encouraged to ask questions. The interactive wagon poster served as a reminder of the importance of filling their imaginary wagon with healthy foods, and on the back of each photograph of fruit or vegetable, key information was provided to stimulate questions and discussion with preschool teachers.

## Program Evaluation

One objective of the program was to increase fruit and vegetable knowledge among preschool participants. To evaluate the success of the program, pre- and post-assessments of the children's knowledge of the fruits and vegetables were performed. Candy and soda pop were also included to measure if children can properly identify healthy and non-healthy foods. Children were asked the following question in individual interviews to measure knowledge: What is this (new food presented to them)? Real foods were used during the interview rather than pictures or food models.

A knowledge score was computed for the child's response to the above question for seven food items: blueberries, sugar snap peas, candy, kiwi, jicama, squash, and soda pop. Correct responses were given 1 point, and incorrect responses were given 0. The total knowledge score range was 0 to 7. The knowledge score increased from pre- to post-intervention, with a mean score increasing from 3.5 ( $\pm 1.8$ ) to 5.9 ( $\pm 1.9$ ) ( $p < 0.001$ ,  $n = 19$ ). The preschool children learned about new fruits and vegetables through this nutrition education program and further demonstrated their knowledge in an interview.

## Conclusions

Parmer, Salisbury-Glennon, Shannon, and Struempfer (2009) have suggested that improved knowledge about fruit and vegetables leads to increased preference for and consumption of fruit and vegetables among children. The nutrition program demonstrates that the combination of nutrition education, repeated exposure to fruit and vegetables, and an environment that supports fruit and vegetable consumption is an effective strategy to increase preschoolers' knowledge about fruit and vegetables. The success of the program warrants its expansion into other communities to replicate measureable outcomes in multiple locations, reaching a diverse group of preschool children. Fruits and vegetables should be chosen for future programs depending on accessibility, interest, and local culture.

The Color Me Healthy! curriculum (Dunn, Thomas, Pegram, Ward, & Schmal, 2004) and other techniques designed for this program are user-friendly, easy to follow, and modifiable to satisfy specific nutrition program objectives. Limitations of the study reported here include the small sample size and, because the study was held in a university setting, limited generalizability to other preschool groups.

## Acknowledgements

We would like to thank the center director, preschool teachers, and graduate and undergraduate students who assisted with the nutrition education program. Financial support for this project was provided by the College of Human Development and Education and the Center for Science and Mathematics Education at North Dakota State University. We would also like to thank Dunn and colleagues, who granted us permission to use the Color Me Healthy! curriculum for our study. More information about the Color Me Healthy! curriculum can be found at <http://www.colormehealthy.com/>.

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