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Together We Inspire Smart Eating: A Preschool WISE curriculum for obesity prevention in low-income families

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Introduction

Few young children consume recommended level of fruits and vegetables.¹ High quality preschool programs often provide food experiences to expose children to healthy food options.^{2,3} However, personal experiences of early childhood educators may inhibit their ability to create a nurturing environment at mealtime and to educate children about nutritious foods. *Together, We Inspire Smart Eating* (WISE) was developed to support educators of young children^{4–14}. The WISE curriculum is intended to be used in weekly food experiences in preschool such as Head Start and schools using the Fresh Fruit and Vegetable Program (FFVP).¹⁵

The intervention, WISE, was designed to establish healthy early eating habits for children 3 to 8 years old. The intervention includes 3 key components: (a) a classroom curriculum, (b) educator training, and (c) parent education using materials for outreach. This report presents a brief summary of the development of the components of WISE. Change in nutrition knowledge of educators across time was examined. Sustainable knowledge is critical given that knowledge and awareness are necessary prerequisites for adoption of new behaviors.^{16,17} This report provides the foundation for later, more detailed process and impact evaluations of WISE. All activities in the project were approved by the University of Arkansas for Medical Sciences institutional review board.

Summary of Development

The development of WISE was based on USDA recommendations¹⁸ combined with concepts of the socio-ecological model.¹⁹ After an extensive literature review, WISE curriculum components were developed to be consistent with the research-based evidence of nutrition promotion for children. Further, components were aligned with state regulations, national standards, and recommendations from experts (e.g., American Pediatric Association). In the development of the classroom curriculum, classroom observations and

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in-person conversations with educators provided targets for educator training.²⁰ For example, educators often pressured children to consume food regardless of hunger cues, they typically failed to model intake of healthy foods, and they discouraged manipulation of new foods.²⁰ These attitudes often stem from a teacher's personal history with food.²¹ Many educators lacked food as children, and 33% indicated current food insecurity.¹⁴

This formative work provided the basis of educator training targeting use of hunger cues, modeling healthy food consumption, and guiding children in sensory food experiences. WISE was structured to reduce educator time to meet existing educational requirements and be budget-sensitive. In the development of WISE parent education and outreach materials, secondary analyses of data from low-income families were analyzed.⁶ This informed the method and content of the parent education component.

The Curriculum

Classroom Curriculum—In an extensive manual, WISE is organized with 8 monthly Discovery Units as listed in Figure 1, Discovery Units. Figure 1 describes 5 steps found in each Unit. Each Unit provides background 'Appetizer' education (Step 1). The month begins with a farmer letter and the arrival of the food. The curriculum mascot, Windy Wise, is a barn owl puppet who "travels" between the classroom and farm to deliver farm news. Food is introduced with sensory exploration (Step 2).

For the remainder of the month, educators select food activities for weekly hands-on food interactions in small groups (Step 3). The primary objective is to maximize children's interaction with foods. Materials support the integration of WISE into other educational activities (e.g., math). Each month includes closing activities to transition to the next food (Steps 4 and 5). Foods introduced early in the school year recur as companion ingredients in later months.

Educator Training—Training for educators consists of an interactive 6-hour training based on adult learning theories^{22,23} and includes active instruction, monitoring, and feedback. In training, educators explored their role in child nutrition, discussed food attitudes and beliefs, practiced using WISE, and practiced using resources to connect with and educate families. Post training, educators reported learning new information (98%), understanding the goals of WISE (100%), holding the view that WISE would be useful (100%), and feeling prepared to implement WISE (100%).

Parent Engagement—Parents received 'back pack' letters from the farmer. Based on behavioral economics theory, the puppet mascot activities were used to excite children²⁴ to increase the likelihood information from WISE would transfer to the home. Parent education was facilitated with an invitation to join a public WISE Facebook page where Windy provided ongoing posts related to the curriculum and nutrition for families with low resources and young children.

Educator Nutrition Knowledge—WISE was implemented (2015–16) in 20 Head Start classrooms, 13 Kindergarten, and 15 First Grade classrooms (N = 48 classroom with 56 educators). Nutrition knowledge of educators was assessed using an investigator-developed,

8-item nutrition knowledge survey 4 times: before and after training, about 2 months after implementation and at the end of the school year (internal consistency ranged from .68 to .71 depending on assessment). Repeated measures ANOVA of 50 (89%) complete cases indicated that knowledge differed statistically across the year ($F(3,47)=30.21, p < .000$) with post training increase sustained up to 9 months after training.

Discussion

WISE was developed with an extensive research foundation and grounding in the evidence base of the disciplines of nutrition, obesity prevention, early childhood, and adult learning styles. WISE was specifically designed for programs serving high-risk children from resource-poor backgrounds but may have the potential for transfer to other settings. This study demonstrated that WISE can be successfully integrated into existing Head Start and Fresh Fruit and Vegetable Program (FFVP) programs with associated significant and sustained changes in educator nutrition knowledge over the school year. However, it should be noted that the internal consistency of the assessment varied from less than adequate (.68) to adequate (.71). Support from educators for the curriculum was high after training and at the end of the year. The evaluation of WISE is ongoing and will include additional examination of the consumption of fruits and vegetables by preschool children, parent perceptions of WISE, and educator views of classroom components. Ongoing evaluation results, details on the cost and acquisition of WISE can be found in Figure 1 and at <http://windywise.com/>. In addition, new studies will fund the examination of how varied implementation approaches affect classroom use of the WISE curriculum and improve to child outcomes.

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<p>Discovery Units:</p>  <p>8 units cover a variety of fruits and vegetables including:</p> <p>Apples • Tomatoes • Sweet Potatoes Bell Peppers • Carrots • Berries Greens • Green Beans</p>	<p>1. Appetizer for Educators:</p> <p> Tomatoes Arrive</p> <ul style="list-style-type: none"> • Delicious Stuff to Know • Vocabulary and skills • Calendar to Guide Experience <p>This section prepares the educator for the food highlighted in the unit. A full list of vocabulary and skills is offered along with unit sections in which they are featured. A calendar is provided to guide educators through the introduction of the fruit or vegetable featured and the various food experiences offered in each unit.</p>	<p>2. The First Bite:</p> <p> Exploring Bell Peppers</p> <ul style="list-style-type: none"> • Letter From the Farmer • Fruit/Vegetable Arrives • Exploring Fruit/Vegetable <p>Children are introduced to the featured fruit or vegetable. A letter from a local or regional farmer arrives with Windy Wise. The letter introduces the food and teaches children about the farm where it is grown. The arrival of the food follows in a few days and the week ends with children exploring the food using a variety of senses: Touch, smell, sound, and sight.</p>
<p>3. Food Experiences:</p> <p> Smashed Fruit Fizz</p> <p>The Food Experiences Menu features six recipes that allow children to experience the featured fruit or vegetable in a variety of forms. Children will assist in preparation of these recipes and will receive safe and supervised experience with a variety of kitchen utensils and tools. Each lesson provides learning objectives that align with teaching standards (e.g., Teaching Strategies Gold) to assist educators with lesson planning and portfolio documentation.</p>	<p>4. The LAST Bite:</p> <p> The LAST Bite...</p> <p>The LAST Bite includes closing activities for each unit.</p> <ul style="list-style-type: none"> • Create a “Things we’ve learned” chart with children’s drawings • Add paper cut-out of featured food to “Windy’s Foods” basket • Select Á La Carte ideas to extend WISE learning in other areas 	<p>5. Á La Carte</p> <p> Extension Activities</p> <p>This optional section features material and activities to enhance the unit and to add additional opportunities for learning. A list of children’s books is included in this section along with a variety of songs, poems, and games that feature the fruit or vegetable included in the unit. Extension activities broaden educational opportunities to areas such as art, science, math, language, and literacy. Learning center activities facilitate individualized, experiential learning.</p>
<p>WISE Cost</p> <p><i>Estimated food cost of WISE/classroom/year: \$210.20</i> <i>Average cost of one WISE unit/classroom: \$26.28</i> <i>Curriculum training provided in one-day</i> <i>Estimates based on based on:</i></p> <ul style="list-style-type: none"> ◆ 2015-2016 pre-K school year grocery prices in a Southern state ◆ Classroom size = 20 students ◆ 1 WISE unit = 4 food activities 	 <p>www.windywise.com</p> <p>Copyright UAMS/WISE 2017</p>	

Figure 1.