

RESEARCH ARTICLE

Harvest for Healthy Kids: A nutrition education curriculum aligned with the Head Start Child Development and Early Learning Framework

Betty Izumi

Portland State University

Jessica Hoffman

Northeastern University

Cara Eckhardt

Portland State University

Angela Johnson

Mt. Hood Community College Head Start

Jennifer Hallman

Portland State University

Dawn Barberis

Oregon Department of Education Early Learning Division

Healthy diets rich in fruits and vegetables are critical for overall health and well-being. Early care and education settings have enormous potential to promote fruit and vegetable intake. In this pilot study, we present and assess the usability of the *Harvest for Healthy Kids* curriculum, a nutrition education curriculum developed in collaboration with Head Start administrators and teachers and aligned with the Head Start Child Development and Early Learning Framework. We used pre- and post-implementation surveys and conducted a focus group to assess curriculum usability. At baseline and post-implementation, the teachers perceived that the curriculum was easy to understand and an acceptable and feasible way to promote fruit and vegetable intake among children. At post-implementation, the teachers perceived that the curriculum required greater systems-level supports. Access to resources, training, and alignment with Head Start policies and practices emerged as critical factors for curriculum implementation.

Keywords: Head Start, nutrition education, farm-to-preschool, community-based participatory research, curriculum, *Harvest for Healthy Kids*

Healthy diets rich in fruits and vegetables are critical for overall health and well-being and are associated with reduced risk of obesity (He et al., 2004) and other diet-related chronic diseases, including cardiovascular diseases (Bazzano, Serdula, & Liu, 2003), and type 2 diabetes (Bazzano, Li, Josphipura, & Hu, 2008). Current national guidelines for children ages 2 to 8 years recommend consuming 1 to 1 ½ cups each of fruits and vegetables daily (U.S. Department of Agriculture & U.S. Department of Health and Human Services, n.d.). However, most children in the United States do not meet these recommendations (Krebs-Smith, Guenther, Subar, Kirkpatrick, & Dodd, 2010). Specifically, only 9.8% of girls and 13.8% of boys aged 4 to 8 years consume the recommended daily amount for fruits and vegetables (Guenther, Dodd, Reedy, & Krebs-Smith, 2006). Low-income children are at greatest risk for low fruit and vegetable intake (Rasmussen et al., 2006). Given that food preferences are formed early in life (Birch, 1999) and are difficult to change once established, preschool-aged children are important targets for nutrition education (Mikkilä, Räsänen, Raitakari, Pietinen, & Viikari, 2005).

Early care and education settings have enormous potential to help children meet their recommendation for daily fruit and vegetable intake (Story, Kaphingst, & French, 2006; Neelon & Briley, 2011). In 2005, approximately 60% of children aged three to six years were in some form of non-parental care on a regular basis (National Center for Education Statistics, 2013). In addition to their ability to reach a large percentage of young children, childcare providers and preschool teachers can promote healthy eating habits by offering children a variety of fruits and vegetables in meals and snacks, and embedding healthy eating practices into daily activities (Nicklas et al., 2001). To date however, there are only a few evidence-based nutrition education curricula that are available for use in early care and education settings (Kalich, Arnold, Austin, Bauer, McPartlin, & Ferri, 2010; Witt & Dunn, 2012).

Head Start is an ideal program for nutrition education targeted to preschool-aged children. During the 2013-2014 program year, nearly 950,000 children aged 3 to 5 years were enrolled in Head Start programs throughout the nation (U.S. Department of Health and Human Services, n.d.). In addition to their ability to reach large numbers of low-income children, Head Start programs are required to provide children with nutritious meals and snacks, include children in developmentally appropriate food-related activities, and provide children, parents, and staff with nutrition education. However, because Head Start programs have flexibility in how they fulfill their nutrition requirements, there is also large variation between and within programs (Hughes, Gooze, Finkelstein, & Whitaker, 2010; Carraway-Stage et al., 2014). For example, one study of Head Start programs in North Carolina reported that delivery of nutrition education varied greatly from as frequently as weekly in some programs to yearly in others (Carraway-Stage et al., 2014). Studies have shown that in Head Start programs and other early care and education settings, nutrition education implementation may be influenced by multiple factors, including teacher knowledge about nutrition, policies and regulations that hinder or promote food-based activities, access to nutrition education resources (e.g. supplies), time constraints, and level of priority placed on nutrition education by program administrators (Derscheid, Umoren, Kim, Henry, & Zittel, 2010; Cotugna & Vickeryn, 2007; Carraway-Stage et al., 2014).

Increasingly, researchers are using community-based participatory research (CBPR) to develop health promotion curricula (Davis et al., 1999; Masters et al., 2002; LaRowe, Wubben, Cronin, Adams, & Vannatter, 2007; Diwan & Wertheimer, 2007; Gregg, Solotaroff, Amann, Michael, & Bowen, 2008; Leff et al., 2010; Parsai, Castro, Marsiglia, Harthun, & Valdez, 2011; Izumi et al., 2013). CBPR is a collaborative approach to research that equitably involves

community and academic partners in all stages of the research process (Israel, Eng, Schulz, Parker, & Satcher, 2013). Curriculum development within a CBPR context integrates evidence-based practice with the needs and priorities of stakeholders (e.g., Head Start teacher, childcare provider) who are responsible for implementing the curriculum. By engaging stakeholders in the development of a culture- or context-specific curriculum, researchers can ensure that the curriculum is relevant to the target audience, uses their language, and reflects their values and beliefs (Nastasi et al., 2000; Power et al., 2005). In addition to enhancing intervention usability, a partnership model to curriculum development promotes stakeholder ownership of the curriculum and therefore increases the likelihood that the intervention will be sustained and integrated into existing operations (Nastasi et al., 2000).

The purpose of this pilot study was to explore the usability of the *Harvest for Healthy Kids* curriculum, an evidence-based nutrition education curriculum (Izumi, Eckhardt, Hallman, Herro, & Barberis, 2015) aligned with the Head Start Child Development and Early Learning Framework (Head Start Resource Center, 2010). Designed using CBPR, the *Harvest for Healthy Kids* curriculum aims to improve children's knowledge of and attitudes towards fruits and vegetables through, for example, cooking and tasting activities, read-aloud book discussions, transition activities, and mealtime discussions. The research questions this pilot study addressed were: 1) To what extent did Head Start teachers perceive the *Harvest for Healthy Kids* curriculum to be acceptable, understandable, and feasible, and 2) To what extent did Head Start teachers believe they needed systems-level supports to implement the curriculum? The *Harvest for Healthy Kids* curriculum was developed in collaboration with Head Start staff (Izumi et al., 2013). Because of this co-ownership, we anticipated that the curriculum would be perceived positively by Head Start teachers both immediately after participating in a training and at the end of the intervention period after implementing the curriculum.

METHODS

Setting and Participants

The *Harvest for Healthy Kids* curriculum represents the work of a community-academic partnership between a Head Start program in Oregon and Portland State University. During the 2012-2013 academic year, the Head Start program served approximately 1,000 preschool-aged children across 12 centers. Enrolled children were from families with low-incomes and diverse racial/ethnic backgrounds (i.e. American Indian, Alaska Native, Asian or Pacific Island, Black or African American, Hispanic/Latino). More than half of the families spoke a language other than English as their primary language.

Nine teachers across three centers participated in the current study. Eight teachers were female; four teachers had 8 or more years of experience as a teacher in early care and education settings, four had 5-8 years of experience, one teacher had fewer than 5 years of experience, and all had earned a 4-year university degree. Nine teachers participated in the survey. Six teachers, representing two of the three centers, participated in the focus group. The male teacher did not participate in the focus group; the demographic characteristics of teachers who participated in the focus group and those who didn't were otherwise similar.

Curriculum Development

The *Harvest for Healthy Kids* curriculum was developed during the 2011-2012 academic year by an eight member work group that included Head Start teachers and administrators and researchers from Portland State University. Prior to developing the curriculum, the workgroup identified the curriculum goals and specific elements, such as picture cards, to include. The workgroup also selected target foods to feature in the curriculum: carrot, butternut squash, sweet potato, cabbage, turnip, rutabaga, berries, beet, and asparagus. These foods were chosen based on several factors, including their nutrient density, abundant availability in Oregon during the academic year, and ease of adding to Head Start meals.

The curriculum development process was iterative and included contributions from both community and academic partners. The researchers drafted the first kit, which was focused on beets. At the beginning of the month, teachers participating in the workgroup implemented the activities and lessons in their classrooms. At the end of each week, the researchers conducted check-in phone calls with each teacher to obtain his/her feedback on the beet kit. At the end of the month, the workgroup met in-person to debrief the teachers' experiences with the beet kit and discuss ideas for improving its culture- and context-specificity and thus, its usability. For example, the teachers suggested organizing the plans into categories that reflected the rhythm and realities of a typical preschool day (e.g. circle time, meal time) instead of by week. Immediately after the in-person meeting, the researchers incorporated the teachers' feedback into the second kit. This process of developing activity kits was repeated each month for eight months. To finalize the curriculum, the Head Start administrators aligned the activity kits with the Head Start Child Development and Early Learning Framework (Head Start Resource Center, 2010) domain and domain elements (Table 1). For further detail on the curriculum development process, please see Izumi et al. (2013).

TABLE 1
 Examples of alignment between the *Harvest for Healthy Kids* curriculum and the Head Start Child Development and Early Learning Framework

<i>Activity</i>	<i>Domain</i>	<i>Domain Element</i>	<i>Strategy</i>
<i>Picture Cards</i>	Physical Development & Health	Health Knowledge & Practice	Look at beets picture cards with children. Discuss how beets are a good for you anytime food and give explanations of why eating vegetables is important.
	Language Development	Receptive Language	Look at <i>Same-but-Different</i> beets picture card with children. Introduce beet varieties (Chioggia, Golden, Red).
	Science Knowledge & Skills	Scientific Skills & Method	Look at <i>How do beets grow?</i> picture card with children. Encourage children to make guesses about which part of the beet is for eating.
		Conceptual Knowledge of the Natural & Physical World	Look at <i>How do beets grow?</i> picture card with children. Engage children in a discussion about how plants grow.
<i>Cooking Activity</i>	Physical Development & Health	Health Knowledge & Practice	Model how to safely use a box grater. Provide children with just enough help to use the grater on his/her own. For example, let the child hold the grater in one hand and a carrot in the other hand; use your hands to guide his hands to grate the carrot.
		Fine Motor Skills	Allow children to use kitchen tools or their hands to help with food preparation. For example, when making asparagus tacos, children can use their hands to snap asparagus spears into small pieces.
	Social & Emotional Development	Social Relationships	Provide opportunities for children to take turns when cooking together. For example, when making winter root vegetable pancakes, children can take turns stirring or adding in spices, flour, and vegetables.
		Self-Concept & Self-Efficacy	Let children do for themselves what they are capable of doing when engaged in cooking activities, whether it is gathering ingredients, peeling vegetables, or cleaning up.

<i>Activity</i>	<i>Domain</i>	<i>Domain Element</i>	<i>Strategy</i>
<i>Cooking Activity</i>	Approaches to Learning	Cooperation	When making a recipe, ask children to work together to prepare the ingredients. For example, when making vegetable soup, ask children to take turns cutting or tearing the cabbage into small pieces to put into the soup.
	Literacy Knowledge & Skills	Print Concepts & Conventions	Read recipes aloud to small groups of children, pointing to specific words and demonstrating left to right, right/left sweep, and top to bottom motion of print.
	Mathematics Knowledge & Skills	Number Concepts & Quantities	After making winter root vegetable pancakes, count out loud the number of pancakes made, pointing to each pancake as the number name is called out. Ask children if there are enough pancakes for each person to get one pancake.
		Measurement & Comparison	Let children compare ingredient quantities for recipes. For example, when making carrot salad, pose questions such as “Is there more salt or pepper in this salad?”
<i>Taste & Tell</i>	Physical Development & Health	Health Knowledge & Practice	Taste asparagus with children. Discuss how asparagus is a delicious anytime food because it is a vegetable. Ask children to name their favorite vegetables.
	Social & Emotional Development	Self-Concept & Self-Efficacy	Taste berries with children. Ask them to share their or their families’ experiences eating, picking, or cooking with berries.
	Language Development	Expressive Language	Taste beets with children. Ask them to describe the taste, texture, and smell of the vegetables. Write down their words and read them back.

Teacher Training

The Harvest for Healthy Kids curriculum was pilot-tested during the 2012-2013 academic year in three centers with the nine teachers participating in the current study. Of the nine teachers participating in the current study, one was involved in the work group. Prior to pilot testing the *Harvest for Healthy Kids* curriculum, the teachers participated in a 4-hour hands-on training. The training focused on study procedures, how to implement the curriculum, and the importance of enthusiastic role modeling (e.g. “Mmmm! I love beets!” “Wow! These beets are crunchy!”) when encouraging children to taste the target foods. The teachers also participated in a 2-hour booster training mid-way (January 2013) through the intervention period. The booster training provided an opportunity for the teachers to share with their peers, how they were integrating *Harvest for Healthy Kids* into their classrooms. In addition to the trainings, the teachers were provided with the curriculum, \$100 for supplies, monthly delivery of fruits and vegetables from the program’s central kitchen to use for sensory exploration and cooking activities, read-aloud books, and kitchen tools (e.g. grater, mixing bowls).

Curriculum Implementation

Each month during the eight-month pilot study period, the teachers implemented 10 activities (e.g. cooking, picture cards, read-aloud book, tasting food) from the activity kit that corresponded with the target food featured in Head Start meals. The teachers had some flexibility in how and when they implemented each of the activities. For example, they could follow the read-aloud book discussion as written during one circle time or read the book in sections throughout the month using their own discussion questions. To assess intervention fidelity, researchers contacted each teacher by telephone each week to ask which activities were conducted that week and to answer any questions the teacher had about how to implement the curriculum. During the study period, a Head Start staff member who was not involved in the pilot study also conducted observations to ensure that teacher mealtime behaviors encouraged children to try the target foods when they were featured in meals.

Data Collection Measures

Survey. We used the Usage Rating Profile – Intervention (URP-I) (Chafouleas, Briesch, Riley-Tillman, & McCoach, 2009) to assess teachers’ perceptions about the usability of the *Harvest for Healthy Kids* curriculum. The URP-I (Chafouleas et al., 2009) was initially developed to provide information about teacher perceptions of school-based interventions. It is a 35-item self-report instrument that is comprised of four subscales: acceptability, understanding, feasibility, systems support. For the purpose of this study we adapted the URP-I to assess teacher perceptions of the *Harvest for Healthy Kids* curriculum. Examples of survey questions are shown in Table 2. The items were rated on a 5-point Likert-type scale from +2 = strongly agree to -2 = strongly disagree. All four subscales previously demonstrated acceptable levels of internal consistency reliability; ranging from $\alpha = .80$ to $\alpha = .96$ (Chafouleas et al., 2009). We collected pre-implementation survey data immediately after the pre-service training; post-implementation survey data were collected at the end of the intervention period.

TABLE 2
Examples of survey questions used to assess usability of the Harvest for Healthy Kids curriculum

<i>Subscale</i>	<i>Question</i>
<i>Acceptability</i>	I would implement <i>Harvest for Healthy Kids</i> with a good deal of enthusiasm. <i>Harvest for Healthy Kids</i> is a good way to increase fruit and vegetable intake among children.
<i>Understanding</i>	I would know what to do if I was asked to implement <i>Harvest for Healthy Kids</i> .
<i>Feasibility</i>	The requirements for implementing <i>Harvest for Healthy Kids</i> are unclear. The amount of time required to use <i>Harvest for Healthy Kids</i> is reasonable. The amount of time required for record keeping with <i>Harvest for Healthy Kids</i> is reasonable.
<i>Systems Support</i>	I could only implement <i>Harvest for Healthy Kids</i> with assistance from other adults. I would need support from my administrator to implement <i>Harvest for Healthy Kids</i> .

Focus Group. The purpose of the 1-hour post-implementation focus group was to better understand the factors that facilitated and hindered implementation of the curriculum. Two main open-ended questions were asked during the focus group: (1) What types of things made it easier for you to implement *Harvest for Healthy Kids*? and (2) What types of things made it harder for you to implement *Harvest for Healthy Kids*? A moderator led the focus group and a research assistant took notes. The focus group was audio recorded and transcribed verbatim.

No incentives were offered for participation in the surveys or the focus group because they were considered to be part of routine program operations. This study was approved through the Institutional Review Board at Portland State University.

Data Analysis

Prior to creating summary variables across each of the four URP-I subscales, we rescaled 9 questions so that positive numbers always aligned with favorable responses and negative responses aligned with unfavorable responses. Within each subscale, we created summary variables by calculating average response across questions within each subscale for each individual. We calculated descriptive statistics (means and standard deviations) for each summary variable pre- and post-intervention.

To analyze the focus group data, we used applied thematic analyses (Guest, MacQueen, & Namey, 2011) targeted toward discovering themes with practical program applications. We first analyzed the focus group using the four URP-I subscales as sensitizing codes. The focus group transcript was coded by the first author and cross-checked by another researcher. We then refined the codes or broke them down into sub-codes. Next, we extracted text associated with a particular code and compared text across participants. Sub-codes that were present across participants indicated themes.

RESULTS

The mean URP-I scores pre- and post-intervention for the acceptability, understanding, and feasibility subscales were ≥ 1.00 , indicating that at pre-intervention, teachers agreed or strongly agreed that the curriculum was acceptable, feasible, and easy to understand and that their views did not change across the intervention period (Table 3). By contrast, the pre-intervention mean score for the systems support scale was 0.35, compared to a score of -0.13 at post-intervention. In other words, at pre-intervention Head Start teachers perceived that implementing the curriculum would require systems-level supports to implement, and this perception was strengthened after the intervention period.

TABLE 3
Head Start teacher pre- and post-implementation Harvest for Healthy Kids usability ratings (n=9)

<i>Subscale</i>	<i>Pre-implementation Mean (SD)</i>	<i>Post-implementation Mean (SD)</i>
Acceptability	1.39 (0.29)	1.35 (0.35)
Understanding	1.05 (0.20)	1.20 (0.29)
Feasibility	1.00 (0.30)	1.02 (0.41)
Systems Support	0.35 (0.37)	-0.13 (0.50)

Three themes related to curriculum implementation emerged from the focus group analyses. First, teachers stressed the importance of having access to readily available nutrition education supplies. One teacher commented that “just having the supplies there when you needed them” made it easier to implement *Harvest for Healthy Kids* activities. The teachers indicated that, in addition to the monthly delivery of target foods for sensory exploration that came from the central kitchen, having the activity plans, children’s books, picture cards, and cooking equipment readily available in their classrooms and centers made it feasible to implement the curriculum with high fidelity. The teachers relied on their education site managers, who are their immediate and on-site supervisors, to purchase other supplies, such as recipe ingredients (e.g. vegetable oil, soy sauce), that were needed to implement the activities. Although the teachers expressed appreciation for the monthly delivery of target foods from the central kitchen, they also said that the fruits and vegetables often arrived later than expected, which made it difficult for them to carry out their lessons as planned.

Second, the teachers indicated that the pre-service and booster trainings helped them to understand how to implement the curriculum. The booster training was considered particularly useful as it reinforced skills learned during the initial training and provided teachers with an opportunity to “share and show” how they were integrating *Harvest for Healthy Kids* activities into their lesson plans. In addition to the pre-service and booster trainings, the weekly check-in phone calls provided teachers with motivation to implement the activities and a chance to ask clarifying questions about the curriculum.

Third, alignment of the *Harvest for Healthy Kids* curriculum with Head Start policies and practices was identified as critical to curriculum implementation. The Head Start Act of 2007 requires programs to align their school readiness goals for children, curricula and assessments

with the Head Start Child Development and Early Learning Framework (Head Start Resource Center, 2010). To meet the requirements of the Head Start Act of 2007, teachers at the Head Start program used Teaching Strategies (TS) GOLD[®] curricula and assessment tools to plan their lessons and activities and document children's progress across identified areas of child development and learning. Aligning the *Harvest for Healthy Kids* curriculum with the Head Start Child Development and Early Learning Framework allowed the teachers to easily integrate *Harvest for Healthy Kids* into their lessons and helped to ensure that the curriculum complemented, rather than competed with, program teaching and assessment strategies. One teacher emphasized that “the fact that you can incorporate [*Harvest for Healthy Kids*] into TS GOLD[®]” was important because meeting program requirements is at the front of teachers' minds.” Given competing priorities, however, the teachers still found it difficult to implement the curriculum during certain times of the year. In particular, the beginning and end of the academic year and the period immediately before and after holidays or short vacation breaks were mentioned as times during which the teachers felt most pressed for time.

DISCUSSION

Nutrition education for preschoolers is critical for laying the foundation for lifelong health. Yet there are few published examples of nutrition interventions that have been implemented in early care and education settings (Williams et al., 1998; Fitzgibbon, Stolley, Dyer, VanHorn, & Kaufer Christoffel, 2002; Kalich et al., 2010; Hoffman et al., 2012; Witt & Dunn, 2012). Even fewer evidence-based nutrition education curricula are available. Increasingly, CBPR is being used in health initiatives because it is considered an effective strategy for integrating local knowledge into the design, implementation, and evaluation of interventions. In an effort to promote nutrition education in early care and education settings and overcome implementation barriers reported in the literature, (Derscheid et al., 2010; Cotugna & Vickery, 2007; Carraway-Stage et al., 2014) we used a CBPR approach to develop the *Harvest for Healthy Kids* curriculum.

As expected, the teachers who participated in this pilot study reported a high level of perceived acceptability, understanding, and feasibility before and after implementing the *Harvest for Healthy Kids* curriculum. By engaging administrators in developing and implementing the curriculum, *Harvest for Healthy Kids* became a program priority; by engaging teachers, we were able to anticipate and address potential implementation barriers related to teacher knowledge, access to nutrition education resources, and policies and regulations that hinder or promote food-based activities. Engaging administrators and teachers also allowed us to align the curriculum with the Head Start Child Development and Early Learning Framework (Head Start Resource Center, 2010), which was used by the Head Start program to make curriculum and assessment decisions.

Although the curriculum was perceived by teachers as acceptable, understandable, and feasible to implement, after implementing *Harvest for Healthy Kids*, the teachers perceived that the curriculum required greater systems-level supports than they initially anticipated. As the focus group findings suggest, prior to implementing the lessons, the teachers may not have anticipated their level of reliance on their education site managers and the central kitchen staff in facilitating their access to resources such as recipe ingredients and food for sensory exploration. In hindsight, given their critical roles, education site managers and central kitchen staff should

have been invited to participate on the workgroup that developed the curriculum; their lack of involvement is likely reflected in the low post-intervention systems-level support score.

Study Strengths and Limitations

To our knowledge, this is the first study to systematically evaluate the usability of a nutrition education curriculum in an early care and education setting. A major strength of this study is the CBPR approach we used to develop, implement, and evaluate the *Harvest for Healthy Kids* curriculum. This approach and the real-world setting in which we conducted the current study enhances the ecological validity of our findings. Further evidence to support the ecological validity of our study is that since the current study ended, the *Harvest for Healthy Kids* curriculum has been implemented at all 12 centers of the Head Start program and all teachers receive supplies (e.g. activity plan, books, picture cards) and training to implement the *Harvest for Healthy Kids* curriculum. In addition, the Head Start program now names the *Harvest for Healthy Kids* curriculum as the curriculum that meets the program's requirement for weekly nutrition and monthly cooking activities. We believe that the involvement of Head Start teachers and administrators was critical in developing a culture- and context-specific curriculum and key to sustaining and institutionalizing *Harvest for Healthy Kids* at the Head Start program.

The current study also contributes to the paucity of studies focused on nutrition education in early care and education settings as well as the literature on the applicability of the URP-I instrument, which was originally developed to assess the usability of behavioral interventions and tested with educators responding to a vignette (Chafouleas et al., 2009).

This pilot study is not without limitations, however. First, we conducted this pilot study with a small, non-representative sample of teachers from one Head Start program. Thus, the results are not generalizable to a larger population. Second, although we explored multiple dimensions of intervention usage, the small sample size limited any ability to examine associations between usage and actual implementation of the *Harvest for Healthy Kids* curriculum. Further research is necessary to determine how perceptions of intervention usage influence implementation, if this relationship varies by factors such as the type of early care and education setting in which the curriculum is implemented (e.g. Head Start, preschool, day care), and if implementation fidelity affects program outcomes. Third, this study used the URP-I, which has since been revised (Briesch, Chafouleas, Neugebauer, & Riley-Tillman, 2013). The revised instrument divides the construct of systems support into two subscales: (1) *System Support* assesses the practical aspects of support, such as a need for professional development, resources, and staff consultation; and (2) *System Climate* assesses the philosophical fit between the setting and the intervention, such as the consistency between the intervention and the school's mission and administrator support (Briesch et al., 2013). Future studies of nutrition education curricula usage in early care and education settings should use the updated version of the instrument.

IMPLICATIONS FOR PRACTICE

Our findings suggest that the *Harvest for Healthy Kids* curriculum may be appropriate for promoting healthy eating habits among children in Head Start programs. Previous researchers

have delineated the multiple obstacles Head Start teachers encounter when promoting nutrition in preschool settings (Hughes et al., 2010; Carraway-Stage et al., 2014). By using a CBPR approach to developing the curriculum and aligning it with the Head Start Child Development and Early Learning Framework, we attempted to address concerns related to these obstacles. It is important to note that we provided the teachers who participated in the current study with resources beyond what may be immediately available to other early care and education professionals. Given that healthy eating habits are critical for lifelong health, we believe that resources to implement nutrition education in early care and education settings are an important investment.

ACKNOWLEDGEMENTS

The authors would like to thank the teachers and staff at the Head Start program involved whose time and energy made this study possible. This study was funded by Kaiser Permanente Northwest.

REFERENCES

- Bazzano, L. A., Li, T. Y., Joshipura, K. J., & Hu, F. B. (2008). Intake of fruit, vegetables, and fruit juices and risk of diabetes in women. *Diabetes care*.
- Bazzano, L. A., Serdula, M. K., & Liu, S. (2003). Dietary intake of fruits and vegetables and risk of cardiovascular disease. *Current atherosclerosis reports*, 5(6), 492-499.
- Birch, L. L. (1999). Development of food preferences. *Annual Review of Nutrition*, 19, 41-62.
- Briesch, A. M., Chafouleas, S. M., Neugebauer, S. R., & Riley-Tillman, T. C. (2013). Assessing influences on intervention implementation: Revision of the Usage Rating Profile-Intervention. *Journal of school psychology*, 51(1), 81-96.
- Carraway-Stage, V., Henson, S. R., Dipper, A., Spangler, H., Ash, S. L., & Goodell, L. S. (2014). Understanding the State of Nutrition Education in the Head Start Classroom: A Qualitative Approach. *American Journal of Health Education*, 45(1), 52-62.
- Chafouleas, S. M., Briesch, A. M., Riley-Tillman, T. C., & McCoach, D. B. (2009). Moving beyond assessment of treatment acceptability: An examination of the factor structure of the Usage Rating Profile—Intervention (URP-I). *School Psychology Quarterly*, 24(1), 36.
- Cotugna, N., & Vickery, C. (2007). Educating early childhood teachers about nutrition: A collaborative venture. *Childhood Education*, 83(4), 194-198.
- Davis, S. M., Going, S. B., Helitzer, D. L., Teufel, N. I., Snyder, P., Gittelsohn, J., ... & Altaha, J. (1999). Pathways: a culturally appropriate obesity-prevention program for American Indian schoolchildren. *The American journal of clinical nutrition*, 69(4), 796s-802s.
- Derscheid, L. E., Umoren, J., Kim, S. Y., Henry, B. W., & Zittel, L. L. (2010). Early childhood teachers' and staff members' perceptions of nutrition and physical activity practices for preschoolers. *Journal of Research in Childhood Education*, 24(3), 248-265.
- Diwan, S., & Wertheimer, M. R. (2007). Aging services or services to the aging? Focus of a university-community curriculum development partnership to increase awareness of aging issues in social work practice. *Journal of gerontological social work*, 50(1-2), 187-204.
- Fitzgibbon, M. L., Stolley, M. R., Dyer, A. R., VanHorn, L., & Kaufer Christoffel, K. (2002). A community-based obesity prevention program for minority children: rationale and study design for Hip-Hop to Health Jr. *Preventive medicine*, 34(2), 289-297.
- Gregg, J., Solotaroff, R., Amann, T., Michael, Y., & Bowen, J. (2008). Health and disease in context: a community-based social medicine curriculum. *Academic Medicine*, 83(1), 14-19.

- Guenther, P. M., Dodd, K. W., Reedy, J., & Krebs-Smith, S. M. (2006). Most Americans eat much less than recommended amounts of fruits and vegetables. *Journal of the American Dietetic Association, 106*(9), 1371-1379.
- Guest, G., MacQueen, K. M., & Namey, E. E. (2011). *Applied thematic analysis*. Sage.
- He, K., Hu, F. B., Colditz, G. A., Manson, J. E., Willett, W. C., & Liu, S. (2004). Changes in intake of fruits and vegetables in relation to risk of obesity and weight gain among middle-aged women. *International journal of obesity, 28*(12), 1569-1574.
- Head Start Resource Center (2010). The Head Start child development and early learning framework promoting positive outcomes in early childhood programs serving children 3–5 years old: Revised.
- Hoffman, J. A., Agrawal, T., Wirth, C., Watts, C., Adeduntan, G., Myles, L., & Castaneda-Sceppa, C. (2012). Farm to Family: Increasing access to affordable fruits and vegetables among urban Head Start families. *Journal of Hunger & Environmental Nutrition, 7*(2-3), 165-177.
- Hughes, C. C., Gooze, R. A., Finkelstein, D. M., & Whitaker, R. C. (2010). Barriers to obesity prevention in Head Start. *Health Affairs, 29*(3), 454-462.
- Israel, B. A., Eng, E., Schulz, A. J., Parker, E. A., & Satcher, D. (Eds.). (2013). *Methods in Community-Based Participatory Research for Health*. San Francisco: Jossey-Bass.
- Izumi, B.T., Peden, A.M., Hallman, J.A., Barberis, D., Stott, B., Nimz, S. Ries, W. R., & Capello, A. (2013). A Community-Based Participatory Research approach to developing the harvest for healthy kids curriculum. *Progress in community health partnerships: research, education, and action, 7*(4), 379-384.
- Izumi, B. T., Eckhardt, C. L., Hallman, J. A., Herro, K., & Barberis, D. A. (2015). Harvest for Healthy Kids Pilot Study: Associations between exposure to a farm-to-preschool intervention and willingness to try and liking of target fruits and vegetables among low-income children in Head Start. *Journal of the Academy of Nutrition and Dietetics*. DOI: <http://dx.doi.org/10.1016/j.jand.2015.07.020>
- Kalich, K., Arnold, L., Austin, L., Bauer, D., McPartlin, D., & Ferri, N. (2010). Early Sprouts: Cultivating Healthy Food Choices in Preschool Children and Families. *Journal of Nutrition Education and Behavior, 42*(4), S125.
- Krebs-Smith, S. M., Guenther, P. M., Subar, A. F., Kirkpatrick, S. I., & Dodd, K. W. (2010). Americans do not meet federal dietary recommendations. *The Journal of nutrition, 140*(10), 1832-1838.
- LaRowe, T. L., Wubben, D. P., Cronin, K. A., Adams, A. K., & Vannatter, S. M. (2007). Peer Reviewed: Development of a Culturally Appropriate, Home-Based Nutrition and Physical Activity Curriculum for Wisconsin American Indian Families. *Preventing chronic disease, 4*(4).
- Leff, S. S., Thomas, D. E., Vaughn, N. A., Thomas, N. A., MacEvoy, J. P., Freedman, M. A., ... & Fein, J. A. (2010). Using community-based participatory research to develop the PARTNERS youth violence prevention program. *Progress in community health partnerships: research, education, and action, 4*(3), 207.
- Masters, H., Forrest, S., Harley, A., Hunter, M., Brown, N., & Risk, I. (2002). Involving mental health service users and carers in curriculum development: moving beyond 'classroom' involvement. *Journal of Psychiatric and Mental Health Nursing, 9*(3), 309-316.
- Mikkilä, V., Räsänen, L., Raitakari, O. T., Pietinen, P., & Viikari, J. (2005). Consistent dietary patterns identified from childhood to adulthood: the cardiovascular risk in Young Finns Study. *British Journal of Nutrition, 93*(06), 923-931.
- Nastasi, B. K., Varjas, K., Schensul, S. L., Silva, K. T., Schensul, J. J., & Ratnayake, P. (2000). The Participatory Intervention Model: A framework for conceptualizing and promoting intervention acceptability. *School Psychology Quarterly, 15*(2), 207.
- National Center for Education Statistics. (2013, December). Digest of Education Statistics, 2012. In *Institute of Education Sciences*. Retrieved August 5, 2015.
- Neelon, S. E. B., & Briley, M. E. (2011). Position of the American Dietetic Association: benchmarks for nutrition in child care. *Journal of the American Dietetic Association, 111*(4), 607-615.
- Nicklas, T. A., Baranowski, T., Baranowski, J. C., Cullen, K., Rittenberry, L., & Olvera, N. (2001). Family and child-care provider influences on preschool children's fruit, juice, and vegetable consumption. *Nutrition reviews, 59*(7), 224-235.
- Parsai, M. B., Castro, F. G., Marsiglia, F. F., Harthun, M. L., & Valdez, H. (2011). Using community based participatory research to create a culturally grounded intervention for parents and youth to prevent risky behaviors. *Prevention Science, 12*(1), 34-47. Birch LL (1999). "Development of food preferences." Annual Review of Nutrition **19**: 41-62.

- Power, T. J., Blom-Hoffman, J., Clarke, A. T., Riley-Tillman, T. C., Kelleher, C., & Manz, P. H. (2005). Reconceptualizing intervention integrity: a partnership-based framework for linking research with practice. *Psychology in the Schools, 42*(5), 495-507.
- Rasmussen, M., Krølner, R., Klepp, K. I., Lytle, L., Brug, J., Bere, E., & Due, P. (2006). Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part I: quantitative studies. *International Journal of Behavioral Nutrition and Physical Activity, 3*(1), 22.
- Story, M., Kaphingst, K. M., & French, S. (2006). The role of child care settings in obesity prevention. *The Future of Children, 14*3-168.
- U.S. Department of Agriculture & U.S. Department of Health and Human Services. (n.d.). Dietary Guidelines for Americans 2010. Retrieved August 5, 2015, from <http://www.health.gov/dietaryguidelines/dga2010/DietaryGuidelines2010.pdf>U.S.
- U.S. Department of Health and Human Services. (n.d.). "Head Start Program Facts Fiscal Year 2013 " Retrieved August 5, 2014, from <https://eclkc.ohs.acf.hhs.gov/hslc/data/factsheets/2013-hs-program-factsheet.html>.
- Williams, C. L., Squillace, M. M., Bollella, M. C., Brotanek, J., Campanaro, L., D'Agostino, C., ... & Boccio, L. (1998). Healthy Start: a comprehensive health education program for preschool children. *Preventive medicine, 27*(2), 216-223.
- Witt, K. E., & Dunn, C. (2012). Increasing fruit and vegetable consumption among preschoolers: evaluation of Color Me Healthy. *Journal of nutrition education and behavior, 44*(2), 107-113.