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Online and In-Person Nutrition Education Improves Breakfast Knowledge, Attitudes, and Behaviors: A Randomized Trial of Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children

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ABSTRACT

Background Although in-person education is expected to remain central to the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) service delivery, effective online nutrition education has the potential for increased exposure to quality education and a positive influence on nutrition behaviors in WIC participants. Education focused on promoting healthy breakfast behaviors is an important topic for WIC participants because breakfast eating compared with breakfast skipping has been associated with a higher-quality diet and decreased risk for obesity.

Objective To examine the influences of online and in-person group nutrition education on changes in knowledge, attitudes, and behaviors related to breakfast eating.

Design Randomized-controlled trial comparing the effectiveness of online and in-person nutrition education between March and September 2014.

Participants/setting Five hundred ninety WIC participants from two Los Angeles, CA, WIC clinics were randomly assigned to receive in-person group education (n=359) or online education (n=231). Education focused on ways to reduce breakfast skipping and promoted healthy options at breakfast for parents and their 1- to 5-year-old children participating in WIC. Questionnaires assessing breakfast-related knowledge, attitudes, and behaviors were administered before and after education, and at a 2- to 4-month follow-up.

Statistical analysis Changes within and between in-person and online groups were compared using t tests and χ^2 tests. Analysis of covariance and generalized estimating equations were used to assess differences in change between groups.

Results Changes in knowledge between pretest and follow-up at 2 to 4 months were similar between groups. Both groups reported reductions in barriers to eating breakfast due to time constraints, not having enough foods at home, and difficulty with preparation. Increases in the frequency of eating breakfast were greater for both the parent (P=0.0007) and child (P=0.01) in the online group compared with the in-person group during the same time points.

Conclusions Overall, this study demonstrates that both in-person and online nutrition education were effective in increasing breakfast-related knowledge in WIC participants, reducing breakfast skipping, and improving other breakfast-related behaviors, showing the potential usefulness for online education modalities for future WIC services.
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NUTRITION EDUCATION FOR ALL ADULT PARTICIpants sets the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) apart from all other federal nutrition assistance programs. Due to its broad reach to more than 8 million mothers and children a year,[1] WIC's success in improving nutrition during pregnancy and early childhood has a substantial influence on the nation's health.[2] Traditionally, WIC has relied upon individual and group education where mothers and other caregivers are provided nutrition information during clinic visits.[3] Multiple studies have documented the effectiveness of in-person nutrition education in the WIC setting.[4-6] With rapid technologic advances and a more diverse WIC clientele, the need to explore innovative education methods that achieve positive outcomes in nutrition-related behaviors is needed.

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Use of technology for health behavior change is a rapidly growing field of study. Use of multimedia kiosks, videos, and online educational modules has been evaluated and associated with improvements in a variety of health-related outcomes, including client enjoyment,[7-9] knowledge and stage of change in infant and child-feeding practices,[10-13] food safety,[14] stage of change in dietary intake,[15-20] physical activity,[16,20] and weight management.[21,22] In a 9-month WIC study, Bensley and colleagues[23] found that online education improved adult participant's fruit and vegetable intake more than traditional group education. However, because participants were allowed to choose their mode of nutrition education, the results may have been influenced by self-selection bias. Recent reviews have therefore called for studies of online education using more rigorous designs.[24,25]

Access to the Internet has rapidly increased in the United States, with 87% of adults using the Internet in 2014.[26] Currently, 90% of American adults have a cellular telephone and 58% have smartphones.[27] Whereas Internet use is still lower among Spanish-speakers than English-speakers and higher among individuals with more education, the digital divide is diminishing.[28,29] In fact, more Hispanic individuals (61%) have a smartphone compared with whites (53%) or African Americans (59%).[27] In a cross-sectional sample of WIC clients surveyed in 2011, half of the respondents (51%) accessed the Internet on a computer device, 23% accessed it via a cellular telephone, and 25% used computerized devices and cellular telephones equally.[30]

To our knowledge, a rigorous evaluation of the relative influences of online and traditional in-person modes of delivering nutrition education in WIC has not been conducted. Given the uncertain federal fiscal climate and the growing interest of WIC participants in accessing education through technology, the development and use of innovative methods of effectively delivering nutrition education to WIC participants has never been more imperative. Therefore, the purpose of this study was to examine the influences of online and in-person group nutrition education on changes in knowledge, attitudes, and behaviors related to breakfast eating in a randomly selected sample of WIC participants. Breakfast was selected as the lesson topic because it had not been taught before as part of nutrition education at WIC-participating study sites and studies have shown that breakfast eating compared with breakfast skipping has been associated with a higher-quality diet and decreased risk for obesity.[31] The hypothesis was that WIC participants receiving online nutrition education would be comparable in breakfast-related knowledge, attitudes, and behavior change scores compared with the in-person nutrition education group. Findings from this study are expected to be useful in providing further documentation of the influence of in-person education, as well as expanding the literature on the influence of online nutrition education in WIC participant behavior change.

METHODS

Participants

WIC participants were recruited from a list of all participants scheduled to come to two WIC Public Health Foundation Enterprises study sites during the 2-month period when the breakfast class was taught in person (April to May 2014). Potential WIC participants were called and asked a series of questions to determine eligibility. These calls were conducted in English and Spanish and clarification questions were answered via telephone. Exclusion criteria included aged younger than 18 years, no child in WIC between ages 1 and 5 years, pregnant, unable to read English or Spanish, a child with any condition known to influence food intake, plans to not return to their WIC clinic during the subsequent 4 to 5 months, or no access to the Internet (via desktop or laptop computer or other mobile device, including smartphone). Pregnant mothers were excluded because pregnant mothers attended group education related to pregnancy and breastfeeding and would not attend the in-person breakfast class. From this eligible group of WIC participants, a random sample of equal numbers of English-speaking and Spanish-speaking participants was selected and assigned to the online group. The remaining sample was not contacted and remained in the in-person education group. Verbal consent was obtained prior to administering the questionnaire and lesson to participants. The University of California, Berkeley, Institutional Review Board approved the study protocol.

Women assigned to the in-person group came in as usual for their regular WIC appointment and received a group nutrition lesson on breakfast. Women assigned to the online group received a telephone call from WIC research staff the week before their WIC appointment and were asked to take the breakfast class online before coming into WIC for their appointment. Women assigned to the online group were e-mailed and/or texted the link to access nutrition education online and instructed to visit the website and complete the breakfast class before their next WIC appointment. Participants were told this would allow them to receive WIC education via the Internet and would facilitate a faster visit at the WIC site for voucher pick-up and individual counseling. In cases where WIC participants refused to complete the online class, then they could attend the in-person education group class and were not included in the study.

Intervention Description: Breakfast Class

Following standard curriculum development protocol, the Public Health Foundation Enterprises WIC nutrition education staff developed the in-person group breakfast class and pilot tested the class in English and Spanish with 10 to 15 WIC participants. The content of the breakfast lesson was focused on the principals of learner-centered education.[32,33] The goals of the breakfast class were to teach participants why it is important for adults and children to eat breakfast every day, why skipping breakfast can lead to poorer health for children and adults, how WIC foods can be used to make healthy breakfasts, and to have participants set personal goals for eating healthier breakfasts. Additional dietary messages taught in the class were: WIC cereals are healthy cereals and have 6 g sugar or less, fruit is a healthy breakfast option, and limit juice to 4 to 6 oz/day. Both in-person and online breakfast classes was offered in English and Spanish and were estimated to take roughly 15 to 20 minutes to complete.

Structure of the In-Person Breakfast Class

The WIC instructor began the class with asking who had eaten breakfast that day, followed by describing the reasons