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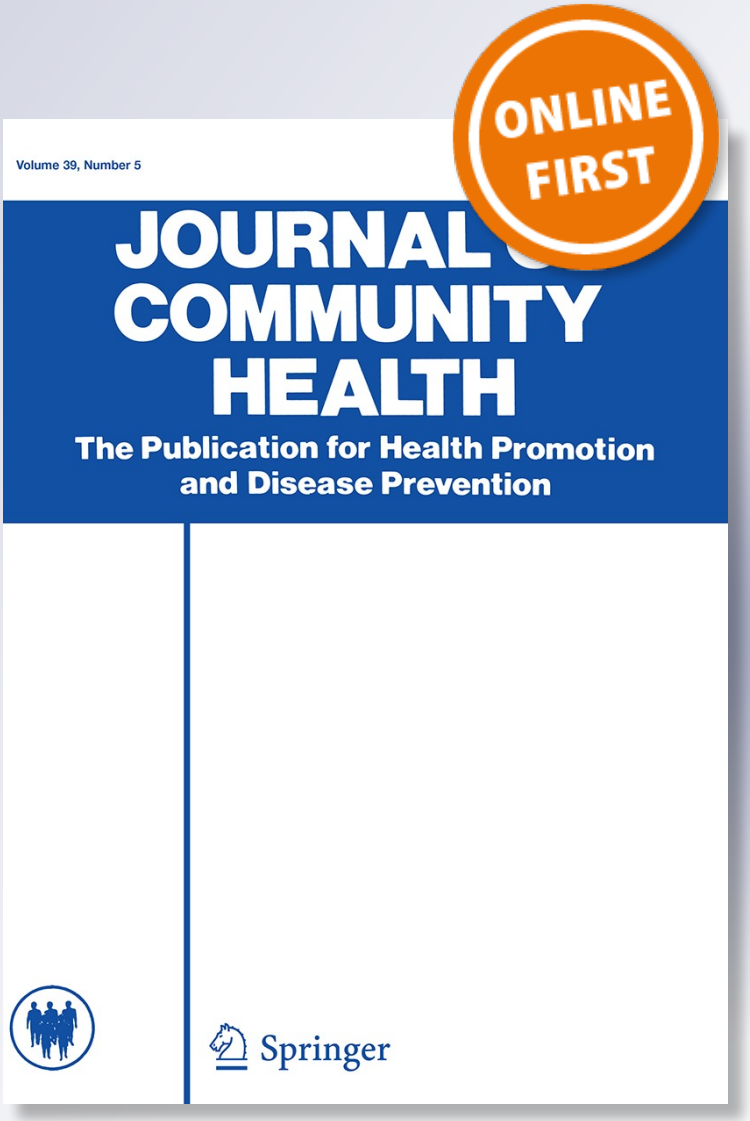

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ORIGINAL PAPER

Telephone and Face-to-Face Interviews with Low-Income Males with Child Care Responsibilities Support Inclusion as a Target Audience in SNAP-Ed

Jodi Stotts Krall · Patricia Wamboldt · Barbara Lohse

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Abstract Federally funded nutrition programs mostly target females. Changes in family dynamics suggest low-income men have an important role in food management responsibilities. The purpose of this study was to inform nutrition education program planning to meet needs of lower-income males. Cross-sectional telephone and face-to-face interviews. Stratified random sample of men (n = 101), 18–59 years of age, with child care responsibilities, living in households participating in the Supplemental Nutrition Assistance Program and a convenience sample of adult males (n = 25) recruited from lower income venues. (1) Scripted telephone interviews about health status, eating behaviors, eating competence, food security, technology usage and topics and strategies for nutrition education. (2) In-person cognitive interviews during review of selected online nutrition education lessons. Nutrition education topics of interest, preferred educational strategies, influences on and barriers to intake, eating competence, critiques of online program content, graphics, format. Bivariate correlations, independent *t* tests, one-way analysis of variance or Chi square, as appropriate. Thematic analyses of cognitive interviews. Of telephone interviewees, 92.1 % prepared meals/snacks for children and 54.5 % made major household food decisions. Taste was the greatest influence on food selection and the greatest barrier to eating healthful foods. Topics of highest interest were "which foods are best for kids" and "how to eat more healthy foods." Preferred nutrition education strategies included online delivery. Online lessons were highly rated. Interactive components were recognized as particularly appealing; enhanced male centricity of lessons was supported. Findings provided compelling evidence for including needs specific to low-income males when planning, designing, and funding nutrition education programs.

Keywords Fathers · Males · Nutrition education · Low-income · Online

Introduction

Men have a shorter life expectancy and higher morbidity and age-adjusted mortality for most leading causes of death in the United States (US) than their female counterparts [1, 2]. Higher disease and death rates experienced by males largely relate to conditions that are associated with modifiable behavioral risk factors, [2] including poor diet and sedentary behavior. As a whole, men consistently fall short of national health benchmarks, including those for healthy weight, [3] fruit and vegetable consumption, [4] and physical activity [5].

Despite an evident need, limited nutrition education resources are directed toward men. Most nutrition education programs, particularly federally-funded nutrition assistance programs, have traditionally targeted females, identifying them as nutritional gatekeepers. However, the changing landscape of family dynamics and household

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structure, including an increase in men living alone, [6] suggest that men have taken a more prominent role in food management responsibilities and household foods choices. According to data collected from a subsample of the 2007–2008 US National Health and Nutrition Examination Survey (NHANES), a majority of men and women in dual headed households report sharing food purchasing as well as meal planning and preparation activities [7]. In addition, dietary patterns have been linked with marital status. Households headed by unmarried men (divorced/separated or never married) are reported to spend a significantly greater proportion of their food budget on commercially prepared food than their married male peers (38 and 60 % higher, respectively) [8]. Research also indicates that males, including low-income males, are engaged in child-feeding responsibilities and influence child eating behaviors [9–11]. For example, in a survey of a 462 fathers, many perceived being responsible at least half of the time for feeding their child [12]. These responsibilities included organizing meals and deciding the amount and appropriateness of the foods offered.

Although the focus of federal nutrition education programming has been on mothers and children, adult males comprise a substantial portion of Supplemental Nutrition Assistance Program (SNAP) participants. In the federal fiscal year 2012, adult males represented 21.1 % of SNAP participants; males 18–59 years of age represented 41 % of all male SNAP participants. In comparison, adult females, represented 33.3 % of all SNAP participants; females 18–59 years, accounted for 50.4 % of female SNAP participants [13]. In Pennsylvania, as of August 4, 2014, adult males represented 19.7 % of the total adult population receiving direct SNAP-Education (SNAP-Ed) programming in FY2014 [14].

Few studies of effective methods to address men's nutrition education needs are available; in part because of historical focus on women, but also because men are labeled as a hard-to-reach audience. Men are less likely to engage in preventative health services and strategies to improve their use of services are not delineated [15]. Disease prevention, sports performance/physical fitness, weight management, and being a good role model have been identified as motivators for healthful eating and physical activity. In contrast, lack of nutrition knowledge, poor cooking skills, general lack of time, work commitments and family responsibilities may serve as barriers to healthful practices [16–18]. However, improvements in nutrition, dietary behaviors, physical activity, and weight management outcomes have resulted from interventions aimed at improving men's health [15, 19]. In a review of nine studies, feedback, self-monitoring, and tailoring were identified as important nutrition education features [20]. Although these findings are encouraging, the intervention components and delivery approaches associated with the intervention appeal and desired behavior changes are unclear. For example, the acceptability to men of new technologies applied to nutrition education has not been studied [19–21]. Certainly, additional objective information is needed to successfully fold men into nutrition education activities.

The purpose of this study was to inform nutrition education programming needs of lower-income males using two approaches: (1) a telephone interview needs assessment and (2) evaluation of a nutrition education intervention developed for a general SNAP audience.

Methods

Assessment of nutrition education needs and preferences of low-income males was examined in two projects: (1) A telephone-based interview of SNAP participants and (2) in-person cognitive interviews of response to an online nutrition education program originally developed for low-income women. The Pennsylvania State University Institutional Review Board approved both projects with consent obtained by the interviewer at the time of the interview.

Project 1: Nutrition Education Needs Assessment

Design and Recruitment

Ten trained and practiced interviewers from a professional survey firm conducted a computer-aided, scripted telephone interview over 12 days randomly selecting names from a list of SNAP participants provided by the Pennsylvania Department of Public Welfare. The random selection protocol was stratified by proportion of SNAP participants/county to ensure representation of SNAP-dense areas yet facilitate state-wide representation. For example, 24 % of names selected were from Philadelphia County, 8 % from Allegheny County, and 3 % from Westmoreland County. After being contacted, eligibility for participation was determined by affirmation of being male, 18–59 years of age, current or prior year SNAP participation, ability to speak and understand English, and involvement to any degree as a caregiver of children (either their own or others) under the age of 18 years. Interviews were conducted until the goal of 100 interviews was reached. Participation was incentivized with a $15 gift card to a chain discount store.

Interview Guide Items

The scripted telephone interview included 27-items addressing demographics, health status, eating behaviors,

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weight satisfaction, eating competence, food security, technology usage and topics and strategies for nutrition education. Respondents self-reported race/ethnicity, employment status, education level, household structure, level of childcare responsibilities (primary or significant caregiver duties, frequent, occasional, infrequent), ages of children under their care, status as major decision maker regarding household food and shopping (yes/no), if they prepare meals or snacks for children (yes/no), household participation in nutrition assistance programs in the last 12 months (SNAP, WIC, food pantries, food banks), current health status (1 = major health problems; 5 = excellent health), and weight satisfaction (1 = very satisfied; 5 = very unsatisfied). Frequency of worrying about having enough money for food (always, often, sometimes, rarely, never) indicated food security status [22]. Eating competence was assessed with the 16-item Satter Eating Competence Inventory for Low Income (ecSI/LI), demonstrated to have translational and construct validity for low-income persons [22]. Diet quality was assessed by proxy with a nine-item food and beverage checklist (bananas, apples, grapes, carrots, chips (potato, nacho, corn), regular soft drinks/soda, diet soft drinks/soda, regular whole/2 % milk, and 1 %/skim milk). Respondents were asked to report (yes/no) on availability of the items in their home in the past week. If respondents indicated lack of in-home availability, they were asked if the items were available in stores where they typically purchase foods/beverages. Also assessed were interest in 12 specific nutrition topics (yes/no), greatest influence on food choices (from a list of 5 factors), and preferred methods to learn about nutrition (yes/no) from a list of eight options. Lists were developed from target audience comments provided in preliminary activities. Barriers to eating healthy foods and other nutrition topics of interest were examined in open-ended questions. Respondents indicated frequency of going online, location of internet use, likelihood of using the internet to learn something about health or nutrition (1 = not at all likely; 5 = very likely) and cell phone and text message use. Respondents who used text messaging were asked additional items about interest and preferences in text message-based nutrition education.

Project 2: *About Eating* Review

About Eating Description

About Eating is a tested, interactive, web-based program based on the four tenets of eating competence [23] with additional focus on physical activity [24]. *About Eating* was designed for and tested with low-income female samples [25]. *About Eating* consists of six lessons that focus on eating attitudes (*Eating Enjoyment),* food acceptance (*Your Food Variety)*, internal regulation of food consumption (*Hunger and Fullness)*, external influences on eating behaviors (*Time to Eat)*, physical activity (*About Being Active),* and body size acceptance (*About My Size)*. *About My Size,* the most recent addition to *About Eating*, was not completed at the time of this study and thus, not included in the interviews. Lessons offer information, self-assessment, self-reflection, and goal-setting through the use of text, graphics, tailored language and content, and user-driven navigation. The stand-alone lessons are self-directed, can be viewed in 15 min or less, in any order, and are accessible online.

Design and Recruitment

Low-income male response to *About Eating* was examined with in-person, individual cognitive interviews. Each participant viewed two *About Eating* lessons with the exception of one participant whose limited time allowed review of only one lesson. A protocol for specific lesson and viewing order addressed possibility of an order effect and facilitated a uniform number of interviews for each lesson. Participants were recruited at low-income venues (e.g., job training centers, housing offices, and community assistance agencies) in five geo-diverse Pennsylvania communities through flyers and word-of-mouth.

Immediately prior to each interview, using a computer supplied by the interviewer, participants completed an online survey (Qualtrics Pro, 2012) that included the ecSI/LI to measure eating competence, [23] as well as questions about frequency of worrying about having enough money for food (always, often, sometimes, rarely, never) to indicate food security status, level of childcare responsibility (little or no responsibility, share responsibility, mostly responsible, solely responsible), meal or snack preparation (yes/no), food choice decisions (never, rarely, sometimes, often, always), age, height, and weight. Cognitive interviews, conducted by trained interviewers, were audio-recorded and held in locations conducive to conversation and reflection. As respondents viewed each page of the assigned lessons, they were encouraged to "talk aloud" noting their thoughts, opinions, reactions, and ideas generated when viewing the page, what should be changed or retained to maximize their lesson interest and usefulness. After each lesson was reviewed, respondents completed the lesson's online Likert-scale evaluation about lesson content, usefulness, readability, length, design, graphics, and ease of website navigation. Cognitive interviews lasted an average of 36 ± 22 min (range 24–55) and were completed in six calendar days during an eight week period. Participants received a $20 gift card to a discount store to cover any costs associated with participation (e.g., parking, child care).

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Data Analysis

Quantitative analyses were conducted using SPSS version 19.0 (IBM, Armonk, NY). Descriptive statistics were obtained to report participant characteristics in both projects as well as for lesson evaluation items in project 2. Relationships among sociodemographic, eating competence, educational and nutrition-related factors for the telephone interviews (Project 1) were examined with bivariate correlations, independent *t* tests, one way analysis of variance (ANOVA) or Chi square, as appropriate. The 16 ecSI/LI items were each scored from 3 (always) to 0 (rarely or never) and summed so that possible scores ranged from 0 to 48. ecSI/LI scores were divided into tertiles and dichotomized as eating competent or not. Eating competence is defined by an ecSI/LI score ≥ 32 [26]. Two trained and experienced researchers analyzed qualitative data from interviews about *About Eating* lessons for common themes, comments, and suggestions. p values < 0.05 were considered statistically significant.

Results

Project 1: Nutrition Education Needs Assessment

To reach the goal of 100 telephone interviews 2,734 calls were placed within 12 days by the 10 interviewers. Major reasons for non-response included answering machine (21 %), disconnected number (17 %), wrong number (14 %), and initial refusal (9 %); 9 % of calls were call back attempts to connect. Of those contacted and interested in participating, 54 were ineligible because they did not provide care to children, only one was disqualified based on age and two did not provide consent. A total of 102 individual interviews were conducted; one interview was excluded because it was learned in the interview that the respondent did not live in Pennsylvania. Interview length ranged from 11.7 to 44.2 min, with an average interview length of 18.5 min.

This statewide needs assessment sample (n = 101; mean age 37.4 ± 13.4 years, range 18–59; median 35) included respondents from 42 of 67 Pennsylvania counties, representing 60 % of rural and 68 % of urban counties in the state. The sample was diverse in employment status (27 % employed full time, 13 % employed part time, 23 % unemployed, but seeking employment, 27 % disabled), race (55.4 % white, 25.7 % black, 7.9 % Hispanic or Latino), educational level (59.4 % high school or less, 28.7 % some college, 10.9 % 2 or 4 year college degree), and household structure (42.6 % 2 adults/couple with children, 11.9 % single male with children). As shown in Table 1, most had significant or primary caregiver responsibilities, nearly all prepared meals/snacks for children, and more than half were the major decision makers regarding household food and shopping. A majority of respondents lived in households receiving nutrition assistance in the past 12 months (60.4 % SNAP; 27.7 % food banks/pantries; 21.8 % WIC) and 53.5 % reported some worry about having enough money for food with 26.7 % denoting their frequency of worrying as always or often. In-home availability of foods and beverages, based on responses to the nine-item food and beverage checklist, included bananas (75.2 %), apples (72.3 %), grapes (55.4 %), carrots (73.3 %), chips (84.2 %), regular soft drinks/soda (79.2 %), diet soft drinks/soda (32.7 %), regular whole/2 % milk (92.1 %), and 1 %/skim milk (31.7 %). Only 5 % of respondents indicated lack of availability of the aforementioned foods and beverages at stores where they shop. A majority of respondents rated their health as excellent or nearly excellent (63.4 %) and 51 % were satisfied with their weight.

Table 1 Select caregiving responsibilities of low-income adult males (n = 101)

Responsibility	n	%
Full-time child care duties	52	51.5
Care for children <5 years old	31	30.7
Care for children 6–10 years old	22	21.8
Care for children 11–18 years old	22	21.8
Part-time child care duties (may be in addition to full time)	64	63.4
Care for children <5 years old	40	39.6
Care for children 6–10 years old	32	31.7
Care for children 11–18 years old	22	21.8
Major decision makers regarding household food and shopping	55	54.5
Prepare meals and snacks for children	93	92.1

Over half of respondents (58.4 %) were eating competent (ecSI/LI ≥ 32); mean ecSI/LI score, which ranged from 8 to 48, was 31.4 ± 8.2. Eating competence was significantly higher in those satisfied with their weight (ecSI/LI score 33.7 ± 7.1 (n = 51) vs. 31.0 ± 8.0 for neutral (n = 26) and 27.4 ± 9.0 for dissatisfied (n = 23); $p = .008$). Eating competence was also associated with perception of having enough money to buy food ($p = .03$). No one in the highest tertile of ecSI/LI scores indicated not having enough money to buy food, whereas 18 % noted this in the middle tertile and 21 % in the lowest tertile. In addition, lack of money as a reason for not eating healthy was cited by only 3 % of eating competent (EC) males, but by 24 % of non-EC males ($p = .006$). Eating competence was not associated with age, race, employment, household status, or education level.

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Table 2 Nutrition education needs of low-income adult males (n = 101)

	n	%
Nutrition topics of interest [*multiple responses possible*]		
Best foods for kids	90	89.1
How to eat more healthy foods	86	85.1
Keeping foods safe to eat	77	76.2
Easy to use recipes	75	74.3
How to manage money for food	72	71.3
Physical activity	71	70.3
Weight loss	64	63.4
How to eat for a specific health problem	64	63.4
Meal planning	63	62.4
Shopping for food	61	60.4
Reading labels	60	59.4
How to cook	58	57.4
Greatest influence on what foods you eat [*selected from list of 4 factors plus "other"*]		
Taste	41	40.6
Nutritional/health value	31	30.7
Cost	16	15.8
Convenience	0	0
Combination of above items or another influencer	13	12.9
Nutrition education methods of interest [*multiple responses possible*]		
Newsletter or other print material	73	72.3
Online lessons or information	62	61.4
One-on-one time with an educator	49	48.5
One-time group class	47	46.5
Text messages	38	37.6
Series of group classes	25	24.8
Podcasts	17	16.8
Other ways	9	5.1

Factors influencing food selection are shown in Table 2. Of the four options listed, taste was most frequently reported as having the greatest influence on food selection. No one indicated that convenience had the greatest influence on the foods they eat.

Barriers to eating healthful foods were identified by 76 % of respondents and ranged from 0 to 3 (mean 0.9 ± 0.7); 58 % reported only one barrier. Most frequently cited barriers were taste preference (20 %), time (18 %), money (16 %), availability (9 %), family (5 %), store inconveniently located (5 %), and lack of choices (4 %). Eating competence was inversely correlated with number of barriers ($r = -0.21$, $p = .03$). Competent eaters reported fewer barriers to healthful eating (EC males 0.8 ± 0.7 vs. non-EC males 1.1 ± 0.7; $p = .03$). Weight satisfaction was also associated with reporting barriers; 100 % of those unsatisfied with their weight reported one or more barriers compared to 73 % with neutral satisfaction and 62 % who were satisfied with their weight ($p = .003$). Barriers to healthful eating were not associated with age, race, education, race, or worry about money for food.

On average, 7.7 ± 3.1 nutrition topics of interest were selected (range 0–11) (Table 2). Nutrition topics of interest were associated with race (non-whites were more interested in managing money, $p = .036$), education level (less educated were more interested in easy recipes, $p < .001$), and weight satisfaction (weight dissatisfied were more interested in weight loss, $p = .024$). Competent eaters tended to indicate an interest in cooking more frequently than non-competent eaters (EC males 64 % vs. non-EC males 48 %; $p = .05$).

Selected nutrition education options ranged from none to 11 (mean 3.16 ± 1.92) (Table 2). Preferred methods were print materials, online information, and one-on-one education. Age was associated with preference for one-on-one education (yes, 40.9 ± 14.0 years vs. no, 33.6 ± 11.0 years; $p = .006$), one time group classes (yes, 42.2 ± 13.6 years vs. no, 33.3 ± 11.9 years; $p = .001$), and podcasts (yes, 45.7 ± 11.0 years vs. no, 35.9 ± 13.4 years; $p = .006$). Those preferring print materials tended to be older (yes, 39.2 ± 13.8 years vs. no, 33.8 ± 12.0 years; $p = .056$). Preferences for online information did not differ by age, urban/rural status, or educational level.

Males reported internet use (69.3 %), mostly accessed from home (n = 61; 87.1 %), but also cell phone (n = 35; 50.0 %), library (n = 14; 20.0 %) or other locations or methods (n = 26; 37.1 %) i.e., at relatives, friends, school, and work or via laptops, mobile devices, and game systems. Nearly three-fourths of those who use the internet stated that they would be somewhat or very likely to go online to learn about health or nutrition. Most respondents have a cell phone and, more than two-thirds of those have a text message plan. One-third of the sample reported interest in receiving text messages on nutrition-related topics with about a fourth of those expressing interest in receiving one or multiple nutrition-related messages weekly.

Project 2: *About Eating* Review

Cognitive interviews were completed by 25 males ranging in age from 18 to 37 years (mean 38.9 ± 10.3 years) with mean body mass index) of 28.3 ± 4.8 based on self-reported height and weight; 46 % were classified as overweight, 29 % as obese. Nearly two-thirds (64 %) were not eating competent. Over half (56 %) reported worrying about having enough money for food with 20 % of interviewees often or always worrying. A majority (n = 14) had sole or shared responsibility for children. Number of children cared for ranged from 1 to 7 (mean of 2.4 ± 1.8). All those

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Table 3 Evaluation of *About Eating* lessons by low-income adult males (n = 25)

	Food variety (n = 10)	Enjoying eating (n = 10)	Hunger & fullness (n = 9)	Time to eat (n = 10)	About being active[a] (n = 10)
This lesson was interesting					
Yes, definitely	9 (90)	8 (80)	5 (56)	6 (60)	6 (60)
Yes, sometimes	1 (10)	2 (20)	3 (33)	3 (30)	2 (20)
No, not very much	0	0	1 (11)	1 (10)	0
No, not at all	0	0	0	0	2 (20)
This lesson was useful for me					
Yes, definitely	9 (90)	4 (40)	4 (44)	6 (60)	7 (70)
Yes, sometimes	1 (10)	6 (60)	4 (44)	2 (20)	2 (20)
No, not very much	0	0	1 (11)	2 (20)	0
No, not at all	0	0	0	0	1 (10)
The lesson was difficult to read					
Yes, definitely	1 (10)	1 (10)	0	1 (10)	1 (10)
Yes, sometimes	0	1 (10)	3 (33)	1 (10)	0
No, not very much	0	2 (20)	3 (33)	2 (20)	3 (30)
No, not at all	9 (90)	6 (60)	3 (33)	6 (60)	6 (60)
Getting around the website was difficult					
Yes, definitely	1 (10)	2 (20)	2 (22)	1 (10)	0
Yes, sometimes	0	0	0	1 (10)	0
No, not very much	0	1 (10)	1 (11)	1 (10)	0
No, not at all	9 (90)	7 (70)	6 (67)	7 (70)	10 (100)
The length of the lesson was good					
Yes, definitely	9 (90)	9 (90)	6 (67)	5 (50)	6 (60)
Yes, sometimes	1 (10)	1 (10)	3 (33)	5 (50)	3 (30)
No, not very much	0	0	0	0	0
No, not at all	0	0	0	0	1 (10)
I liked the overall design and/or color					
Yes, definitely	10 (100)	5 (50)	4 (44)	7 (70)	5 (50)
Yes, sometimes	0	5 (50)	5 (56)	3 (30)	4 (40)
No, not very much	0	0	0	0	0
No, not at all	0	0	0	0	1 (10)
I liked the pictures[b]					
Yes, definitely	9 (90)	4 (40)	5 (56)	6 (60)	3 (33)
Yes, sometimes	1 (10)	6 (60)	4 (44)	4 (40)	5 (56)
No, not very much	0	0	0	0	0
No, not at all	0	0	0	0	1 (11)

Most participants (n = 24) reviewed two lessons; one participant reviewed one lesson due to time constraints. Table entries are n (%)

[a] Unfavorable responses to evaluation items for "About Being Active" were not isolated to one participant

[b] One missing response for "I liked the pictures"

responsible for children also decided what meals or snacks to prepare for children (9 always/often, 5 sometimes).

As detailed in Table 3, lessons were positively received with a majority rating lessons reviewed as interesting and useful. Lessons were deemed appealing in terms of design, color, graphics, and length. Males indicated that they really liked the focus on physical activities and exercise and healthy foods (e.g., fruits and vegetables). Many also expressed enjoyment of quizzes embedded in the lessons and sidebar features (e.g., recipes). Several males (n = 8) verbally expressed a liking for the exercise IQ quiz in the *About Being Active* module, with one respondent indicating that he wanted "more facts on how staying active helps you out more." They identified with photos of families and did not suggest removing photos of women; however, respondents did request adding photos and icons with sports and activity-oriented subjects that appeal to males (e.g., basketball, football, weight-lifting, fishing).

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Comments made during the review process suggested that minor modifications would improve the lesson content both generally and specific to a male audience. General modifications included adding a brief overview at the beginning of each lesson and revising specific slides that caused confusion. For example, because dieting may be confused with nutrition and healthy eating, respondents suggested definitions be provided. In addition, respondent suggested reframing some messages to better identify the importance of nutrition information to males. Some males requested that sport drinks be added as an alternative to water, indicating a need to add content to explain why the two beverages are not equivalent.

Most reviewers did not experience difficulties reading the lessons or navigating the website. Responses generated during the review process indicated that lesson experiences would be enhanced by reducing the amount of text, simplifying verbiage, increasing font size, including voice-overs or read-along assistance, and reducing pop-up screens from full to half page to minimize navigation problems.

Discussion

Findings from the telephone interviews about nutrition education needs and the *About Eating* critiques from face-to-face interviews provided compelling evidence for including needs specific to low-income males when planning, designing, and funding nutrition education programming. To our knowledge, this is the first assessment of nutrition education needs specific to low-income males caring for children. The study confirmed that low-income men are significantly involved with household food purchasing and preparation and snack and meal preparation for children. More than 92 % reported preparing meals and snacks for children and over half were the major decision makers regarding household food and shopping, giving special significance to the fact that the nutrition education topics of greatest interest were "which foods are best for kids" followed by "how to eat more healthy foods." Taste was identified as having the greatest influence on what males eat as well as serving as the largest barrier to healthful eating. Interestingly, no respondents delineated convenience as having the greatest influence on the foods respondents eat. These findings offer insight into ways to package nutrition messaging to appeal to a male audience.

Results also revealed that low-income males are not homogenous in their preferred nutrition education topics, methods, or needs. Nutrition education tailoring is suggested because of associations with race (non-whites were more interested in managing money), education level (less educated were more interested in easy recipes), age (older males tended to prefer print and one-on-one education), weight satisfaction (weight dissatisfied were more interested in weight loss), and eating competence (competent eaters were more interested in cooking more frequently).

The internet may be a viable delivery mechanism for reaching a broad range of low-income men because 61 % of males indicated that they would most likely participate in nutrition education delivered as online lessons/information, but age, urban/rural status or educational level were not associated with the online preference. Others also have found that males, in general, prefer online education [21, 27]. In a qualitative study exploring intervention attributes that influenced user engagement in a randomized controlled trial testing the efficacy of an interactive web-based intervention versus a print intervention with men, participants randomized to the print intervention requested that information be transferred to a web-based platform [27].

Eating competence scores of low-income males were higher than studies of low-income women yet similar to mixed gender samples not targeted by income [22, 26, 28]. Eating competence has been associated with positive health practices in female only or mostly female samples (including being more physically active) and higher diet quality [25, 28–32]. Males who are not eating competent may present a greater challenge to nutrition educators because they cited fewer topics of interest (specifically with less interest in cooking), and more barriers to healthful eating. In addition, males who were not eating competent were less satisfied with their weight and more likely to cite lack of money as a reason for not eating healthy. These findings support attention to education to enhance eating competence in low-income males.

Cognitive interviews with a small sample of low-income men, many of whom were responsible for caring for and feeding children, provided a male perspective to the online *About Eating* lessons. *About Eating,* which has been tested with low-income women, has been shown to enhance food resource management skills (2014, unpublished data). Males responded favorably to *About Eating, (*i.e., finding the lessons useful, interesting, appealing, easy to navigate, and of the appropriate level of readability and length). Congruent with studies showing that males like self-monitoring and tailored feedback features of web-based interventions, [19, 21] viewers particularly liked the interactive lesson components, including quizzes with generated feedback. This is encouraging given that previous research of web-based weight, nutrition, and activity interventions have identified usability, convenience, and enjoyment as important factors to males [20]. However, suggestions were made to enhance male centricity such as changing some photos, reducing/simplifying text, adding more facts. Our findings suggest that transforming current female-focused

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interventions may be a feasible, cost-effective strategy to address male nutrition education needs.

The investigation of nutrition education needs of males with child caregiving responsibilities is limited by the relatively small sample size and testing with males from only one state. However, males were randomly selected from a defined population of SNAP participants living in households with children under the age of 18. Results may not generalize to males of other socioeconomic positions or SNAP populations in other states. In addition, the convenience sample recruited for lesson review consisted of males 18–37 years. As such, reviews and suggestions for *About Eating* specifically and online education in general, may not apply to older men; race and ethnicity were not collected for those reviewing *About Eating*. Furthermore, the study was not designed to determine the impact of the *About Eating* lessons on male dietary- and activity-related behaviors; this should be a focus of future research.

Finally, although this study explored nutrition topics and delivery methods of interest, it did not assess best approaches for recruiting low-income males to participate in interventions [20]. An increasing trend is to recruit males from workplaces, yet the appropriateness of this strategy for recruiting low-income men is unknown. Recruitment using social media such as Facebook, has been shown to be a successful, cost-effective recruitment method for women, but has not been specifically studied in men [33, 34].

SNAP-Ed guiding principles recommend targeting nutrition education efforts to women and children as the most effective and efficient way to reach the SNAP-Ed population, but don't preclude focusing efforts on other audiences, including men and adults without children [35]. This needs assessment with male SNAP participants and critique by low-income males of a SNAP-Ed approved intervention designed for women revealed that including males with child care responsibilities, even focusing on them, is reasonable and necessary for SNAP-Ed nutrition education.

Implications

Nutrition educators and other dietetic practitioners working with low-income groups should include male nutrition needs when engineering nutrition interventions. Strategies to research include modifying programs and activities previously developed for mostly female participants. Online nutrition programs, with interactive, reflective, and goal setting activities, such as *About Eating,* should be explored to best engage low-income males.

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