Evaluating nutrition education programs: A look at cultural relevance and educator perceptions

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Evaluating nutrition education programs: A look at cultural relevance and educator perceptions

by

Onikia Nicole Esters

A dissertation submitted to the graduate faculty in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

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2008

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DEDICATION

In Loving Memory of

O’Shandra L. Brown
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ABSTRACT

Evaluating nutrition education programs: A look at cultural relevance and educator perceptions

Effective nutrition education can decrease the incidence of diet-related chronic diseases, including obesity, type 2 diabetes, cardiovascular disease, and hypertension. African Americans bear a disproportionately higher incidence and prevalence of diet-related chronic diseases. African Americans also have a higher attrition rate in research studies. Evaluating effectiveness, retention rates, educator perceptions of nutrition programs, and the perceived need for culturally relevant strategies for African Americans within nutrition education interventions are important aspects for developing acceptable and appropriate interventions to increase positive outcomes for African American participants.

Focus groups and individual interviews were conducted as part of a community needs assessment to determine the perceived needs of an African American community to develop appropriate programming. Using the same community, surveys were distributed to African American participants to assess the perceived need for culturally relevant strategies the African American community. Lastly, focus groups and individual interviews were conducted in this community to assess the implementation of culturally relevant strategies to increase African American participation in Iowa State University Extension programming. Focus groups and individual interviews were also conducted to determine educator perceptions of the use of the Transtheoretical Model of Behavior Change to increase fruit and vegetable consumption in a multi-state study for low income young adults.
Data from a multi-state study to increase fruit and vegetable consumption was further analyzed to determine similarities and differences between African American and White participants to predict the characteristics of participant retention. Qualitative data was analyzed using NSR, and quantitative data was analyzed using SPSS, version 15.

Themed from the focus groups and survey indicate that culturally relevant strategies are preferred among African American participants. The educators indicated that the Transtheoretical Model of Behavior Change was a useful tool in providing nutrition education materials via the telephone. Similarities and differences between retained African American and White participants and within African American participants were determined. Future studies should examine preferential differences in receiving culturally relevant nutrition education strategies.
CHAPTER 1

INTRODUCTION

Dissertation Organization

This dissertation is organized into six chapters. Chapter 1 provides an introduction of racial health disparities, using culturally relevant strategies in program design and evaluation. Chapter 2 provides a detailed literature review of the research problems. The third chapter is a manuscript prepared for publication in the *Journal of Extension*. The fourth chapter is a manuscript published in the *Journal of Nutrition Education and Behavior* (Esters, Boeckner, Hubert, et. al, 2008). Chapter 5 is a manuscript prepared for publication in the *American Journal of Health Promotion*. Chapter 6 is the final chapter, and contains general conclusions and recommendations for future work for these research areas. Individual lists of references are provided for each of the three manuscripts presented in chapters 3, 4, and 5; references cited in the introduction, literature review, and general conclusions are provided after chapter 6.

Description of Research Problem

Nutrition education is an important component in preventing diet-related chronic diseases, including obesity, type 2 diabetes, cardiovascular disease, and hypertension. Effective nutrition interventions can decrease the incidence of diet-related chronic diseases in high-risk communities by promoting changes in diet-related behaviors. Evaluating effectiveness, retention rates, and the inclusion of minority groups within nutrition education interventions are important aspects for generalizable intervention outcomes. Determining the differences between those
who do or do not complete the intervention is studied less often, but can impact the
direction of future recruitment and retention strategies. Additionally, analyzing
nutrition education interventions by race will help identify, develop, and implement
appropriate and effective nutrition interventions to aid in the elimination of racial
health disparities in the United States.

Eliminating health disparities is a national goal of the United States,
implemented by the US Department of Health and Human Services, *Healthy People 2010* (2000). Health disparities are a result of access to health care, environment,
biology and genetics, and human behavior (Satcher and Higginbotham, 2008). The
Office of Minority Health & Health Disparities, of the Centers for Disease Control
(CDC) and Prevention, and many researchers suggest that culturally sensitive
education and intervention programs in African American communities are needed
to diminish health disparities (Anderson, Beresford, Lampe, Knopp, and Motulsky,
2007; CDC, 2001; Gaston, Porter, and Thomas, 2007; Resnicow, Baranowski,
Ahluwalia, and Braithwaite, 1999a). Cultural sensitivity was defined by Resnicow et
al. (1999a) as “the extent to which ethnic/cultural characteristics, experiences,
norms, values, behavioral patterns and beliefs of a target population as well as
relevant historical, environmental, and social forces are incorporated in the design,
delivery, and evaluation of targeted health promotion interventions.” Cultural tailoring
was defined by these same researchers as the “process of creating culturally
sensitive interventions.” Hiring project staff of similar race and ethnicity to the
participants and developing and using materials that are culturally relevant are
effective strategies commonly used in health intervention projects (Agurs-Collins,
Ten Have, Adams-Campbell, and Kumanyika, 1997; Ard, Rosati, and Oddone, 2000; Auslander, Haire-Joshu, Houston, Rhee, and Williams, 2002; Fitzgibbon, Strolley, and Kirschenbaum, 1995; Kanders et al., 1994; Kreuter et al., 2005; Resnicow et al., 1999b; Resnicow et al., 2001). Culturally relevant approaches that focus on minority groups are useful in increasing knowledge of and improving attitudes toward nutrition (Resnicow et al., 1999a). Retention of African American and other minority participants in existing and future nutrition education programs may be improved by the use of culturally relevant materials.

Nutrition prevention/intervention programs that have attempted to change dietary behaviors are typically more effective in increasing knowledge than changing food choice behaviors (Contento et al., 1995). As a result, research is needed to identify more effective and practical ways to encourage changes in nutrition behaviors (Serdula et al., 2004). The Transtheoretical Model of Behavior Change (TTM), which includes the Stages of Change Model (SOC), processes of change, decisional balance, and self-efficacy, is a tested model for improving nutritional and other health-related behaviors (Green et al., 1999). Additionally, evaluating the educators’ perceptions of their use of TTM to provide nutrition education may help to increase the effectiveness of program outcomes.

The disproportionately higher incidence and prevalence of nutrition related chronic disease in the African American community establishes the need for developing and implementing, effective and acceptable nutrition education for this population. African Americans also have a lower rate of recruitment and a higher rate of attrition in research studies, and many researchers fail to analyze their data
by race. This combination makes it hard to generalize research results. The educators are another major component of providing effective interventions; however, few researchers have reported the perceptions of those delivering the intervention. More research is needed examining differences between races, reporting educator perceptions, and evaluating the need for cultural relevance.
CHAPTER 2
LITERATURE REVIEW

Health Disparities

The age-adjusted (for all ages) death rate for the African American population is about 30% higher than the risk for the European American population (Mininion, Heron, Murphy, and Kochaneek, 2007). The five leading causes of death for all Americans in 2004 were heart disease, cancer, stroke, chronic lower respiratory diseases, and unintentional injuries (National Center for Injury Prevention and Control, 2006). Just as there is a difference between African Americans and White Americans regarding the death rate, differences also exist in the order for the leading causes of death. For African Americans, diabetes is the 4\textsuperscript{th} leading cause of death; however, diabetes is the 7\textsuperscript{th} leading cause of death for Whites (Heron, 2007). In 2004, the age-adjusted heart disease death rate was 1.3 times higher for African Americans than Whites, and the death rate for diabetes among African Americans was 2.2 times higher than among Whites (CDC, 2006). The prevalence of diet-related chronic diseases is also higher among African Americans, who are 1.4 times more likely to be obese than Whites and 1.5 times more likely to have high blood pressure (CDC, 2006). Additionally, African Americans are 1.7 times more likely than Whites to have diabetes (CDC, 2006).

Willingness to Participate

Definitions

There is a lack of specific research which describes motivations for research subjects’ willingness to participate, the impact of recruitment strategies on their
potential to enroll, and retention rates in clinical research. Much less data exist on these same subjects for behavioral intervention research. For the purposes of the present research, willingness to participate is defined as the likelihood that an individual will participate when given the opportunity; recruitment is defined as the number of individuals who accept the invitation to participate; participation is defined as the number of eligible individuals who enroll in the intervention; and retention is defined as the number of individuals who complete the intervention.

**Racial Differences**

A primary factor of retention is how willing an individual is to participate in the study. In a study to determine racial differences among factors that influence the willingness to participate in medical research studies, Shavers and colleagues (2002) surveyed 91 African American and 88 White residents of the Detroit Primary Metropolitan Statistical Area. Mailed survey responses indicated residents were more willing to participate if they were White, female, under age 65, and had at least a high school education. More African Americans (22%) than Whites (9%) reported that the race of the doctor was very important when seeking medical care; of those reporting race to be important; 46% of African Americans, in contrast to 10% of Whites, reported being less willing to participate in a medical research study in the future. Additionally, African Americans were approximately three-times less likely to participate in future medical research based on their knowledge of the Tuskegee Study. In that study, African American men diagnosed with syphilis were not given a treatment for 40 years in order to examine the natural progression of the disease in a large, long-term cohort study.
Similarly, a pilot study by Advani et al. (2003) examined willingness of oncology patients to participate in clinical trials and reported significantly more Whites (45%) than African Americans (31%) were willing to participate. However, religion, education, and income, rather than race, were correlated with a decreased willingness to participate in the clinical trial. Results of this study also indicated differences in willingness to participate by clinic, but failed to provide community demographic data for the clinic sites. Not only were African Americans educationally and financially disadvantaged when compared to Whites, but educational and financial statuses also were different between clinic sites. The researchers failed to discuss race of personnel for the clinics; thus the impact of the staff on willingness to participate cannot be assessed.

A meta-analysis by Wendler et al. (2006) of 20 published health research studies reporting consent rates by race concluded that race did not determine participants’ willingness to participate in medical research. The researchers present conclusions contrary to other researchers regarding willingness to participate; however, fewer minorities than Whites were invited to participate in the studies under review. Another observation from the meta-analysis was that inviting minorities to participate, along with making clinical studies more accessible, and providing child care and travel expenses were reported to increase the willingness of minorities to participate. This review located only 20 studies that reported consent rates by race, which implies that, although researchers may include minorities in their research, they are not reporting the data by race. Additionally, this review included only clinical research, and cannot be generalized to behavioral research.
The majority of empirical research regarding participation by race is reported from clinical studies. Des Jarlais et al. (2005) examined participation rates of minorities in health behavior research. Women (n = 2,800) from a registry were invited to complete a telephone survey about breast cancer prevention via postal mail. Whites were more than twice as likely as African Americans to indicate interest in the survey, but there was no significant difference in completion of the survey. Similar to clinical research results, these researchers identified the lack of a high school diploma by the African Americans as an association with a lower likelihood of participation; however, there was no association between whites and education as a predictor for participation.

**Recruitment**

**Minority Inclusion**

Recruitment of minorities in health research has been a long-standing challenge, thus making higher participation and retention rates a challenge as well. Overcoming the challenge of low minority recruitment would be useful in retaining African American participants in community-based interventions. To combat this challenge, minority inclusion in randomized clinical trials was mandated by the National Institutes of Health Revitalization Act (NIHRA) in 1993. This act required investigators carrying out clinical research to demonstrate adequate representation of minorities. Unfortunately, this mandate does not apply to behavioral research; thus, there is a continuing challenge: to recruit minority participants in multi-race community-based health interventions that may decrease the diet-related disease disparity. The recruitment of minority participants is a two-fold challenge; convince
researchers to actively seek minority participants, and convince individuals to participate in health interventions.

Although the effects of the NIHRA have not been examined quantitatively, the NIHRA mandate to identify the intent to enroll minorities in research studies has not made a positive impact on the recruitment of minorities in cancer clinical trials. From 1998-2001, minority enrollment in trials sponsored by the National Cancer Institute decreased while total enrollment increased by 22% (Christian and Trimble, 2003). Additionally, only 8% of more than 18,000 recruited participants in the National Cancer Institutes Prostate Prevention trial were minorities (Moinpour et al., 2002). Minorities continue to be underrepresented in clinical treatment trials. Enrollment in cancer clinical trials (from January 1, 2003 to June 30, 2005) funded by the National Cancer Institute reported that 87% of the participants were white and 8% of the participants were African American (2006). The challenges of recruitment have also been indicated in an early community based cancer prevention study among low-income inner-city African Americans. Researchers contacted or attempted to contact 275 women from a patient registration log at a community hospital in Atlanta and successfully recruited only 55 women (Blumenthal, Sung, Coates, Williams, and Liff, 1995).

**Recruitment Strategies**

Recruitment strategies have been employed in various ways. Even the most successful recruitment strategies do not yield higher retention rates for minority participants (Wilbur et al., 2006). Therefore, some researchers suggest using multiple recruitment strategies to increase the probability of recruiting minorities
(Wilbur et al., 2006). For a walking intervention, Wilbur et al. (2006) developed a quasi-experimental design using two treatment groups and reactive recruitment (the process of hearing about a program and making an individual effort to find out more about the program) approaches for working class African American women 40-65 years old. Recruitment strategies included, printed materials (distributed in local gathering places and during community presentations and health fairs), newspaper advertisements, same-race recruitment staff, and word-of-mouth. The greatest number of women who showed interest (responded to recruitment strategies only) was a result of learning about the intervention primarily through word-of-mouth. The most effective forms of recruitment (as indicated by the number of women who showed interest [responded] and enrolled), were the community presentations (48%), community distribution of brochures (47%), followed closely by word-of-mouth (46%). Anderson and colleagues (2007) also used flyers, presentations, advertisements, and public service announcements to increase African American (18-69 years old) recruitment in a multiple-race vitamin supplement study. These researchers also reported the use of printed materials and presentations among the most successful recruitment methods used. Forty-five percent of the participants were recruited by flyers (placed in libraries, barber/beauty shops), followed by presentations (35%); however, word-of-mouth recruited a substantially lower number of participants (14%). The success of recruitment strategies may also differ by age. In a study to increase physical activity in African American seniors, only 8% of the sample was obtained via community presentations, and a large percentage were recruited by telephone (33%) (Coleman et al., 1997). Similar to the previous studies
(Anderson et al., 2007; Wilbur et al., 2006), where printed media (flyers/brochures) was one of the most popular recruitment methods, Coleman and colleagues (1997) indicated that 33% of African American seniors were also responsive to printed media. Word-of-mouth was the second most successful method, recruiting 26% of the African American seniors. Thus, recruitment strategies may not only have to be multiplifactorial and consider race, but age and gender may also play important roles in successfully recruiting African Americans for research studies.

Ultimately, more research is needed to examine recruitment strategies of minorities. Results of a literature review by Shavers-Hornaday and Lynch (1997) identified successful recruitment strategies for African American participants included the following methods for African American participants:

1. An active commitment to the recruitment of African American subjects.

2. Efforts to enhance the credibility of the study in the general community through outreach programs and advertisements.

3. The involvement of local churches and community organizations.

4. Publicity campaigns directed at African Americans.

5. Patient considerations such as convenient hours of operation, study-supplied transportation or reimbursement for transportation costs, and the location of the study centers.

6. The use of incentives.

7. The use of African American role models.

8. Flexibility and the willingness to make necessary adjustments to the study design.

10. Door-to-door canvassing.

These strategies have also been suggested in broader terms by Dennis and Neese (2000). Dennis and Neese suggest there are six concepts to successful recruitment and retention of diverse population groups: (1) historical cognizance; (2) sanctioning; (3) trust-building; (4) mutuality; (5) recognition of heterogeneity; and (6) researcher self-reflection and introspection.

Some of the documented strategies used specifically to recruit African Americans include mass publicity campaigns, referrals from doctors’ offices, targeted mailings, decreased costs, financial incentives, cultural sensitivity, and church meetings (Agurs-Collins et al., 1997; Doshi et al., 1994; El-Khorazaty et al., 2007; Fitzgibbon, Stolley, Schiffer, Sanchez-Johnson, Wells, and Dyer, 2005; Gaston et al., 2007; Melkus et al., 2004; Paskett et al., 1999; Resnicow et al., 1999a; Resnicow et al., 1999b). One of the most commonly used and successful methods for recruiting African Americans suggested by the literature is through the African American church and community leaders (Anderson et al., 2007; Doshi et al., 1994; Hargreaves et al., 1999; Paskett et al., 1999; Paskett, DeGraffinreid, Tatum, and Margitic, 1996; Resnicow, 2001). However, the majority of these studies were also designed specifically for African Americans. Resnicow and colleagues (2001) recruited an African American church congregation to implement and evaluate an intervention to increase fruit and vegetable consumption among African Americans (18-87 years old). Likewise, a study to develop an algorithm for determining the stages of change for dietary fat intake in African American women recruited
participants from predominantly African American churches (Hargreaves et al., 1999). An early pilot study to test the effectiveness of a nutrition education and physical fitness training program in lowering lipid levels in African American elderly also recruited the participants from a church (Doshi et al., 1994). Thus the African American church has been used successfully as a conduit to recruit all ages for various types of research.

The recruitment strategies described by both Dennis and Neese (2000) and Shavers-Hornady and Lynch (1997) were suggested by multiple focus groups. A focus group study of African American men identified community involvement, having an African American researcher, and continued feedback as methods to improve recruitment and retention (Hoyo, Reid, Godley, Parrish, Smith, and Gammon, 2003). Another focus group study examined recruitment strategies for an obesity prevention trial employing center-specific recruitment methods targeting African American adolescent girls (Story et al., 2003). The focus groups identified the blood draws and no-treatment control group as unacceptable. Additionally, the researchers were made aware of other programs that would be of interest to the caregivers for their daughters. Caregivers were interested in enrollment for their daughters for health education and self-esteem; however, the girls were interested in enrollment based on how fun it would be.

Some researchers report increased participation when employing recruitment strategies cited by Dennis and Neese (2000) and/or Shavers-Hornaday and Lynch (1997). In a recent behavioral intervention to reduce smoking, depression, and intimate partner violence during pregnancy for low-income African American and
Latino women, researchers employed numerous strategies to minimize some of the cited difficulties of the recruitment and retention of minorities (El-Khorazaty et al., 2007). The researchers included financial incentives, recruitment training, and cooperation from clinic staff. Of 1398 eligible participants, 85% consented to participate, demonstrating these recruitment methods were highly successful.

**Participant Perceptions**

Focus groups have also been used to increase prospective recruitment in African American participants; however, some researchers have retrospectively implemented one or more of the recruitment strategies discussed by Dennis and Neese (2000) and/or Shavers-Hornaday and Lynch (1997) and also increased recruitment. Due to slower recruitment of African American participants in a recent multi-race vitamin supplement crossover study, Anderson et al. (2007) implemented additional strategies to increase recruitment of African Americans. As suggested by the African American community leaders, the researchers connected with African American churches, barber/beauty shops, sororities/fraternities, community centers, and the neighborhood library through flyers, advertisements, public service announcements, and presentations. From these extensive efforts, 57 African Americans were screened, 46 participants completed a mandatory trial phase of clinic visits every 6 weeks for 14 months, 42 participants began the study, and 31 participants completed the study. The greatest percentage of African American participants was recruited by presentations (46%). In contrast, the greatest percentage of non-African American participants was recruited by the flyers (56%).
**Recruitment Goals**

Multi-race studies rarely implement additional strategies to recruit African Americans, which may be a result of the lack of an established recruitment goal. *A prior* defining minority recruitment goals in research studies may impact overall recruitment strategies. Durant et al., (2007) reported that the average minority recruitment goal was highest for African Americans (33%) and lowest for Asian Americans (10%). The researchers also reported that the failure rates to meet recruitment goals for African Americans were significantly higher when compared to the recruitment of both Whites and Asian Americans. Interestingly, these researchers also concluded that experienced researchers with a longer history of federal funding were more likely to meet minority recruitment goals for African Americans compared to new investigators. The staff of the National Cancer Institute surveyed the top 25 institutions with the highest minority recruitment to provide recommendations on ways to increase minority participation in clinical trials based on their success (Christian and Trimble, 2003):

1) Provide lay personnel.

2) Simplify consent forms.

3) Increase patient access.

4) Provide greater support for research relevant to underserved minority populations.

5) Concentrate funding in areas where underserved patients go for treatment.

6) Increase minority healthcare workers and staff.
7) Train non-minority physicians to speak with minorities about clinical trials.

8) Use education and marketing tools directed to the underserved populations.

9) Provide incentives and support to those participating in clinical trials.

Another survey of 440 principal investigators (354=white; 38=minority) identified factors associated with successfully recruiting minority populations as having a strong belief of the importance of minority inclusion; not making midstream modifications in recruitment; and reporting fewer recruitment barriers (Williams and Corbie-Smith, 2006).

There are many components to successfully recruiting African Americans in research studies. Unfortunately, employing successful recruitment strategies does not guarantee increased participation and or retention of African Americans. Recruitment strategies may be independent of retention strategies, but both require specific attention and methodology. Successful recruitment strategies are the first step to improving participation and retention of a diverse group of individuals in research studies.

**Participation**

**Barriers to Participation**

Despite the successful use of various recruitment strategies, some barriers to participation in the African American community still exist. Discussions of the barriers for participation of African Americans in medical research are cited extensively throughout the literature. Low participation rates of African Americans in
disease prevention research have been attributed to sociocultural barriers that lack empirical evidence (Ard et al., 2000). However, the paucity of data available regarding barriers to participation within African Americans in behavioral research implies that behavioral researchers have either not published data to determine the barriers to participation of African Americans in behavioral research or that behavioral researchers have assumed that the barriers to participation in medical research may be transferred to those of behavioral research. An extensive list of suggestions regarding participation barriers in medical research, as described by Shavers and colleagues (2002), includes:

- the Tuskegee Study;
- distrust;
- lack of awareness about research studies;
- fear of being used as guinea pigs;
- economic barriers;
- communication issues;
- disproportionate study exclusion;
- beliefs regarding researchers willingness to conduct ethical studies;
- the failure to actively recruit African Americans for studies;
- fatalistic attitudes towards diseases such as cancer;
- negative attitudes towards study staff;
- racial composition of study staff;
- and racism.

These suggestions are supported by findings of other researchers (Branson, Kavis, and Butler, 2007; Corbie-Smith, St. George, Moddy-Ayers, and Ransohoff, 2003). Unfortunately, few of these reported suggestions are based on empirical data (Shavers et al., 2002), and hardly any discuss barriers to participation in behavior research.

A qualitative study by Corbie-Smith, Thomas, and Williams (1999) is one of the few research studies that provide empirical evidence of reported barriers to African American participation in medical research. Focus groups, moderated by an
African American, revealed some of the concerns regarding participation in medical research, including belief that the research would not benefit the African American community, increased risk of being infected with a virus, and distrust of physicians. More recently, Hoyo, Early, Frederickson, and O'Brien (2003) conducted focus groups to examine the barriers of participation in prostate cancer research among African American men and their significant others. Like Corbie-Smith and colleagues (1999), Hoyo and colleagues (2003) used an African American moderator. The emerging themes in this study were mistrust (related to the Tuskegee Study and the death of Charles Drew, the African American surgeon who performed the first open heart surgery and who died waiting for care at a hospital), lack of knowledge of chronic diseases, and lack of commitment to the research. The results of these focus groups are identical to the barriers of African American participation discussed by Shavers et al. (2002), Branson, Kavis, and Butler (2007), and Corbie-Smith, St. George, Moddy-Ayers, and Ransohoff (2003).

French, Jeffery, Story and Neurnark-Sztainer (1998) used a convenience sample of Women Infants and Children participants to determine barriers of participation in weight-loss programs. In this multi-race study, cost of weight-loss program and child care were cited most frequently as important barriers to participation in a weight-control program. Recently, researchers conducted individual interviews with African American and Latino women to gain insight into their recommendations to the best approaches to participatory health research in their communities (Pinto, McKay, and Escobar, 2008). The women recommended that: trust and commitment to the community be the foundation of the preventive
research; a diverse and knowledgeable staff and researchers interested in the needs of the community are employed; and clear expectations about the project are provided to the participants.

Convincing an individual to participate does not imply that the individual will complete the intervention or prevention program. Yet, use of successful recruitment strategies as detailed by Dennis & Neese (2000) and Shavers-Hornaday and Lynch (1997) may help to overcome some of the participation barriers described by Shavers and colleagues (2002) and suggested by African Americans (Corbie-Smith et al., 1999; Hoyo et al., 2003) leading to increased recruitment and retention.

Retention

Participant Retention Characteristics

Researchers conducting various multi-race health-related studies report lower retention for African Americans than for Whites (Dunbar-Jacob et al., 2003; Janson, Alioto, and Boushey, 2001; Wilbur et al., 2006). Recently, Nitzke and colleagues (2007) reported a 51% retention rate of African Americans compared to a 71% rate of retention for Whites in a 12-month intervention to improve fruit and vegetable consumption among low-income young adults. The researchers reported that participants who were more likely to complete the intervention were White, female, and better educated.

Honas and colleagues (2003) identified variables that predict dropout in a multi-race 16-week weight-loss program, which included behavioral meetings. Participants were placed on a low-fat, calorie-restricted diet with medical supervision based on accepted clinical guidelines. Bivariate results showed that the risk of
dropout was higher among participants who were female, divorced, African American, and less than 50 years of age. However, in a multivariate analysis, neither race nor marital status were associated with retention.

Similar characteristics among Whites who completed an intervention were reported among African Americans who completed an intervention by Blumenthal and colleagues (1995). These researchers conducted a culturally sensitive longitudinal cancer prevention study within an inner-city African American community. Participants who completed the intervention were more likely than participants who did not complete the intervention to have higher incomes, be married or living as married/co-habitating, better educated, and be employed.

Although retention of African American participants is an on-going challenge, the majority of the increased retention strategies appear to be reported in studies specifically designed for African Americans, as opposed to multi-race studies. Consequently, participant retention is reportedly higher for predominantly African American interventions.

**Retention in African American Interventions**

Researchers have reported improved retention of African American participants in studies when they employed flexible staff, computer tracking, face-to-face approaches to recruitment, childcare, cultural relevance, financial incentives, and transportation (El-Khorazaty et al., 2007; Senturia, Mortimer, Baker, Gergen, Mitchell, Joseph, and Wedner, 1998). Studies with higher participant retention rates among African Americans have utilized one or more of the recruitment strategies discussed by Shavers-Hornaday and Lynch (1997). A pilot study by Kanders and
colleagues (1994) to promote weight loss for working-class African American women attributes the success of the study to the use of trained African American group leaders, ethnic foods, group support sessions, and a culturally-based lifestyle education program. Ninety-one percent of the participants completed the program and attended more than 8 of the 10 scheduled sessions. A population-based case control study by Moorman, Newman, Millikan, Tse, and Sandler (1999) examined participation in the Carolina Breast Cancer Study and reported an increase in the rates of completion for both African American cases and controls when the interviewer and participants were of the same race.

Similarly, Melkus et al. (2004) reported a 90% attendance rate in group interventions and 100% attendance rate for nurse practitioner care visits in a pilot study testing the feasibility of a culturally-sensitive intervention of education and care for African American women with type 2 diabetes. This study provided African American lay health assistants with culturally-relevant recipes, written materials, and videotapes.

In a 10-week weight-loss pilot study specifically for African American women, 61 of the 67 enrolled completed the program (Kanders et al., 1994). Likewise, high retention rates (79%) were reported in a low-income, minority focused behavioral intervention for pregnant women by El-Khorazaty and colleagues (2007). Additionally, Krueter and colleagues (2005) reported a 72% retention rate for low-income African American women participating in a culturally-tailored mammography and fruit and vegetable consumption study. In contrast, Anderson et al. (2007) reported no differences in retention strategies for their dietary supplement study
between African American and non-African American participants. Retention rates for African Americans (74%) and non-African Americans (81%) were not significantly different; lending credence to the importance of acceptable recruitment strategies.

Most research studies do not report information regarding reasons for withdrawing from a study. However, Janson and colleagues (2001) matched minority participants who withdrew from a large multiple-site asthma study to those who completed the study to determine the factors influencing a participant to complete the study. Using interviewers of the same race as the participants and monetary compensation, participants were interviewed by telephone at the conclusion of the original study. Similar to other studies, a lower retention rate among African American females was reported. However, this study was able to provide an explanation for the reasons for completing or withdrawing from the study. Problems reported only by those who withdrew from the study included, concerns about expense, lack of child care, difficulty reading study material, and insensitive staff. Significantly more participants who withdrew than participants who completed the study reported additional problems such as; work interference, lack of time, record-keeping too complicated, difficulty rescheduling appointments, and taking study medications was too hard. There was no significant difference between groups with problems controlling asthma, willingness to complete requirements, lack of transportation, or other medical problems. Those who completed the study reported that payment, commitment, and belief in the importance for their health encouraged them to stay in the study. This study offers insight into ways to enhance retention
and develop participant friendly interventions by identifying problems encountered by both those who completed and those who withdrew from the study.

**Culturally Tailored Interventions**

**Theoretical Approaches**

Although many of the culturally-appropriate nutrition interventions for African Americans have been successful, most often they lack a clear theoretical approach, which may also influence participation, retention, and/or compliance. A few studies have reported positive outcomes using a combined theoretical approach and cultural relevance (Fitzgibbon et al., 2005). The most commonly-used theoretical framework in culturally-relevant health-related interventions is the Social Learning Theory (SLT), which explains how people acquire and maintain certain behaviors (Boyle and Holben, 2006). SLT has proven to be effective in weight control (Fitzgibbon et al., 2005; Gans, Kumanyika, Lovell, Risica, Goldman, Odoms-Young, Strolla, Decaille, Caron, and Lasater, 2003), type 2 diabetes (Melkus et al., 2004), physical activity (Resnicow et al., 1999b), and breast health (Kreuter et al., 2005) in interventions for African American adolescents and women. More recently, the transtheoretical model (TTM), a model based on readiness to change, includes SOC, decisional balance, self efficacy, and processes of change, has been used for nutrition interventions. SOC, which identifies five stages through which individuals move to make a change has been used in health related interventions (Prochaska & Velicer, 1997). The five stages are described as precontemplation (no intention to change behavior), contemplation (thinking about making a change, but not considering change within the next six months), preparation (intending to take action within the next month),
action (has modified behavior to overcome problem for 3-6 months), and maintenance (sustained new behavior 6 months–5 years). Individuals move or skip through the stages of change forwards or backwards. Decisional balance is the perceived benefits and risks to change. Self-efficacy is the confidence in an individual’s ability to make a necessary change. Processes of change are the steps an individual takes to make the change.

SOC has been used in studies citing positive results for reducing fat intake (Auslander et al., 2002; Campbell, DeVellis, Strecher, Ammerman, DeVellis, and Sandler, 1994; Hargreaves et al., 1999), increasing fruit and vegetable intake (Campbell et al., 1994; Di Noia, Schinke, Prochaska, and Contento, 2006; Krueter et al., 2005; Nitzke et al., 2007; Richards, Kattlemann, and Ren, 2006) and the use of mammography (Krueter et al., 2005) in interventions designed specifically for African Americans.

**Interventions Employing Cultural Relevance**

Positive outcomes for African-American participants were improved in interventions where culturally-relevant strategies were added. For example, the Duke University Rice Diet was developed in the mid-1930s and successfully produced weight-loss and lifestyle changes in the participants using dietary counseling, nutritional education, and an exercise program (Ard et al., 2000). Ard and colleagues (2000) modified the Duke University Rice Diet for African Americans by decreasing the cost by 62% (from $170 to $106), adding culturally-sensitive recipes, addressing attitudes about exercise, and including family members in the weight loss efforts. Overall, participants were satisfied with the diet regimen and
personal changes in weight, BMI, systolic and diastolic blood pressure, and cholesterol levels. Additionally, the researchers failed to provide a comparison between the modified and original Duke University Rice Diet. Failing to provide a comparison between the interventions prevents further understanding of differences between African Americans and Whites. The researchers also failed to provide the race of the administers of the diet program, thus, the impact of the race of the diet program administers on the program may not be assessed.

Recent research examining the impact of using a culturally-tailored behavioral intervention in a randomized control study was conducted by Krueter and colleagues (2005) relative to the use of mammography and fruit and vegetable consumption. Participants were randomized into one of four study groups: behavioral construct tailoring (BCT) (more commonly called behavior models), culturally-relevant tailoring (CRT), a combination of both (BCT + CRT), or delayed intervention/usual-care (control). Results from this study demonstrated women in the combined group were more than twice as likely to use self-reported mammography at the 18-month follow-up as women in the control group (95% CI). However, mammography adherence did not differ between the BCT or CRT and the control group. The combined group also reported greater increases in daily fruit and vegetable servings. The researchers found no evidence of effectiveness using the culturally-tailored construct alone; however, the intervention was effective when combined with a behavioral construct. The results of this study provide evidence that using culturally-tailored strategies or behavioral constructs independently of one another does not increase the effectiveness of interventions for African Americans.
Another study used three theoretical approaches (Social Cognitive Theory, TTM, and Person, Extended Family Neighborhood) to develop a gender-specific culturally relevant intervention to decrease the risk factors of physical inactivity, poor nutrition and stress (Gaston et al., 2007). Positive trend changes between pre- and post- test were observed in the intervention group for physical activity, healthy eating, and stress management. There were no significant changes noted in the comparison group. An earlier study to promote dietary changes, weight loss, and physical activity for individuals with type 2 diabetes was designed specifically for overweight urban African Americans, 55-79 years of age (Agurs-Collins et al., 1997). The intervention included culturally tailored recipes in addition to employing staff the same race of the control group. There was a significant difference ($p < .01$) between the intervention and control group after the first 12 weeks; the intervention group lost weight, whereas the control group gained weight. The differences in weight loss, BMI, and glycosylated hemoglobin at 6 months were significantly ($p < .01$) lower in the intervention than the control group; diastolic blood pressure net difference was also significantly ($p < .05$) lower in the intervention group. Although there were significant ($p < .05$) differences in physical activity, nutrition knowledge, and energy intake at 3 months between the groups, there were no significant differences in the same characteristics at 6 months between the groups. These studies demonstrate the effectiveness of culturally tailored interventions that include a theoretical model.

Likewise, Govula, Kattelman, and Ren (2007) concluded that culturally-appropriate nutrition lessons increased fruit and vegetable consumption in American Indian children. The researchers conducted a pilot study to test a culturally tailored
nutrition curriculum using a control group and an intervention group. Similar to other studies, Govula and colleagues (2007) found significant differences between the change in consumption of fruit and vegetables from baseline to completion between groups. This study does not provide evidence of a difference between culturally-tailored and non-culturally-tailored nutrition education interventions, nor does it provide data regarding retention. The difference in results regarding the use of culturally tailored educational materials is evidence for continued research to determine the best methods for providing effective and acceptable nutrition education to African Americans.

**Evaluating Nutrition Education Programs**

**Definitions**

The Centers for Disease Control and Prevention (CDC) describes “*effective program evaluation is a systematic way to improve and account for public health actions that involves procedures that are useful, feasible, ethical, and accurate*” (*CDC, 1999*). The purpose of program evaluation is to gather information for making decisions about redistributing resources, changing program delivery, or continuing a program (Boyle and Holben, 2006). Rossi, Lipsey, and Freeman (2004) divide these dimensions into 5 main categories: needs assessment, program theory, process analysis, impact analysis, and cost-benefit and cost-effectiveness analysis. A needs assessment is an exploration of what is happening; program theory is a summary of the strategies and interventions used to achieve program outcomes; process analysis is a summary of the steps in carrying out a program; a cost-effectiveness analysis is a comparison of programs on the basis of a measureable outcome; and a
cost-benefit analysis usually considers only one program at a time and compares the monetary costs and benefits of a program (Rossi et al., 2004; White, 1988). Evaluations may be qualitative or quantitative, formative or summative, and should be included in the development, planning, and implementation of a program. Evaluations also differ from research in that they lead to judgments, whereas research seeks conclusions (Fitzpatrick, Sanders, & Worthen, 2004). Evaluations may be formative; to provide information for program improvement, or summative; to determine if a program should continue, expand, or be used other places (Fitzpatrick, Sanders, & Worthen, 2004).

**Educator Perceptions**

Program evaluation, both formative and summative, is a major component in determining program challenges, successes, and effectiveness. Most commonly, nutrition education programs are evaluated based on participant outcomes rather than educator perceptions. However, Contento, Randell and Basch (2002) reviewed approximately 12 published evaluations (most published in the 1980’s) of educator experiences. The evaluations included information regarding in-service training for nutrition educators that assessed knowledge and skills gained. A more recent evaluation examined the perceived work context of nutrition educators of the Expanded Food and Nutrition Education Program in New York (Dickin, Dollahite and Habicht, 2005). The researchers reported an association between perceived work context and effectiveness of a nutrition program.

**Cost Analysis**
A cost-analysis may be categorized as either a cost allocation, cost-effectiveness analysis, or a cost-benefit analysis. A cost allocation is used to determine the true cost of providing a given unit of service (Kettner, Moroney, & Martin, 1990). Cost-effectiveness and cost-benefit analysis has been previously defined. Many studies neglect to provide a cost-analysis within the evaluation of the program. Thus, there is a lack of data on the cost-analysis of behavioral research studies. Specifically, little work has been completed on the cost-analysis of telephone calls to disseminate nutrition education information. Telephone calls used to obtain quantitative food frequencies with widely scattered populations were determined to be less expensive and resulted in higher response rates compared to face-to-face interviews (Fox, Heimendinger, & Block, 1992; Lyu et al., 1998; Shanks, Nicholls, & Freeman, 1981; Wu, Fung, Chan, & Lairson, 2004). Clinical research using telephone calls has proven effective for reinforcing treatment regimens and monitoring patient care (Bell et al., 2005; Kris-Etherton et al., 2002; Muender, Moure, Chen, & Sevick, 2000; Simon, VonKorff, Rutter, & Wagner, 2000), as well as providing cost-effective education (Costanza et al., 2000; Dornelas, Sampson, Gray, Waters, & Thompson, 2000; Muender, Moure, Chen, & Sevick, 2000; Weinberg, Tierney, Cowper, Katz, & Booher, 1993).

Limitations in the Literature

The literature lacks research using a randomized controlled design using interventions created for the majority population as well as with culturally-relevant strategies for minority groups. Instead, the majority of research has been conducted
without randomized control design, using interventions developed for one race, which includes culturally-relevant strategies.

The literature lacks important information that may help to increase positive outcomes for African Americans. Few studies have examined the need for culturally-tailored nutrition education using a randomized control design. However, many researchers have concluded that culturally-tailored materials increase positive outcomes. Although minority participation in clinical studies may have increased, an increase in analysis of the data by race has not occurred. Barriers to recruitment, participation, and retention by African Americans have been described by many researchers; however, few studies have provided evidence for such claims.

Understanding racial differences and similarities between participants who complete and those who do not complete may lead to increased recruitment and retention of African American participants; in both clinical and behavioral studies. Increased retention of African Americans receiving nutrition education for diet-related chronic diseases may help to decrease the burden of diet-related diseases in this population.

Stage-based, tailored and/or interactive educational materials have been examined for their effectiveness in initiating and reinforcing behavior change (Campbell et al., 1994; Richards et al., 2006), but little work has been completed evaluating the perceptions of the educators using the educational medium to provide nutrition education. Instead, knowledge and skills gain has been commonly evaluated because nutritionists or dietitians are typically not the individuals providing the nutrition education (Contento et al., 2002).
PROBLEM STATEMENT

The recruitment and retention rates of African Americans in nutrition education programs, along with the disproportionate prevalence of nutrition-related health problems of African Americans, indicate a need to evaluate the underlying causes of low recruitment and retention of participants in nutrition education programs. Several studies have cited positive outcomes using culturally relevant strategies in programs designed specifically for African Americans. However, few educational interventions have been developed to examine racial differences. Likewise, the majority of studies developed to validate the need for cultural relevance in nutrition education have not been randomized controlled studies. Furthermore, the empirical evidence does not indicate the differences within or between races of those who complete a behavior change nutrition education program and those who do not complete the program. Developing nutrition interventions that address health-related racial disparities may lead to increased program retention and effectiveness, leading to decreased rates of diet-related chronic diseases and death rates, particularly for African Americans.
CHAPTER 3

AFRICAN AMERICAN AWARENESS AND PERCEPTIONS OF EXTENSION RESOURCES IN AN IOWA COMMUNITY

For submission to the Journal of Extension (JOE)

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ABSTRACT

One-third of the African American Iowan population resides in urban communities and bear a disproportionate burden of nutrition related health diseases (US Census, 2006). These factors make African American Iowans high-risk families for living in poverty and chronic diseases. With a growing African American population, Iowa State University Extension employed African American Educators to increase programming for African American families in urban areas of Iowa. Qualitative and quantitative data were collected to examine the need for cultural relevance in a selected community. Qualitative (interviews and focus groups) and quantitative (survey) data support the need for culturally relevant nutrition education in this community. More research is needed to assess the perceived need of culturally relevant nutrition education materials in order to provide appropriate and acceptable programs for African Americans.
INTRODUCTION

The Office of Minority Health (2003) reports that African Americans are more likely than Whites to have a stroke (2 times more), to have high blood pressure (1.5 times more), and to have been diagnosed with diabetes (2 times more). African Americans also have the highest mortality rate from all forms of cancer.

Only 2.5% of the population in Iowa are African Americans, with about one-third residing in six counties with urban communities: Black Hawk (8.1% African American), Johnson (3.7% African American), Linn (3.3% African American), Polk (5.2% African American), Scott (6.4% African American), and Woodbury (2.5% African American) (US Census, 2006). The African American population in Iowa is below the national average (12.5%); however, just as national racial/ethnic health disparities exist in the United States, the burden of some diet related diseases are higher in African American than White Iowans. Twenty-five percent of non-white/non Hispanic Iowans reported fair or poor health compared to twelve percent of Whites, and 50% of African American Iowans under 18 live in poverty compared to 13% of White Iowans (Iowa Department of Public Health (IDPH), 2006a). More than twice as many African American Iowans report being told they had diabetes, and more African Americans have diabetes than Whites (36% vs. 27%) in Iowa (IDPH, 2006a).

Reversing these trends will mean increasing the prevention and early identification of chronic diseases within this population, and implementing best practices in disease management to decrease the burden of disease. This will require building one on one relationships and developing small group education from trusted professionals committed to living in the community.
Iowa State University Extension (ISUE) has a long history of providing training and education to Iowa families at high risk. One of the goals of ISUE is to enhance services within urban communities and improve the quality of life for urban residents (ISUE, 2007). To meet the needs of the growing African American population in Iowa, ISUE employed African American professionals specifically for urban communities with high African American populations to establish a network of professionals focused on African American families. The philosophy was to increase communication and networking between agencies serving African Americans in the community, and engage and support the growth of natural community leaders who would continue the focus of strengthening African American families long-term. The purpose of this paper was to examine the presence of ISUE in an African American community before and after implementing culturally relevant strategies.

METHODS

Pre- and Post-employment Community Assessment

A community assessment was conducted for a previously identified urban county using questions adapted from the University of California Los Angeles (UCLA) Center for Health Policy Research (UCLA Center for Health Policy Research, n.d.). The assessment consisted of audio-taped focus groups and individual interviews in person or via telephone of key community informants and leaders prior to hiring (Appendix A) and at the end of the 3rd fiscal year of employment (Appendix B) for the ISUE Educator. Snowball (technique for requiring a sample that involves existing study participants to provide contact information for other individuals who may be interested in participating in the study (Patton, 1990) sampling was used to identify
and invite key community informants and leaders to participate in an individual interview or focus group. A target goal of 2 focus groups (containing 6-8 participants) was established based on recommendations by other researchers (Krueger & Casey, n.d.; Lewis, 2000; Marczak & Sewell, n.d.; CDC, n.d). As an alternative to the focus group, individual interviews were offered to individuals not available to participate in the focus group. All focus groups and individual interviews were audio-taped. Community informants and leaders were not compensated for their participation.

**Educator Journaling**

The Extension educator hired specifically to establish a network of professionals focused on African American families recorded journal entries of community perceptions and interactions on a weekly basis for the first six months of employment. The journal entries (Appendix C) were guided by an outline based on previously identified challenges of ISUE Educators from veteran ISUE Educators the community assessment. Interviews, focus groups, and journal entries were reviewed for themes using QSR N6 (QSR International Pty, Ltd).

**Participant Survey Development and Distribution**

A survey instrument with a 4-point Likert response scale (Appendix D) was developed to determine African American participants’ perception of receiving nutrition education by an African American. The survey was pilot tested by participants (n=15) in Extension programs in Story county for clarity, and the results and comments were used to revise the instrument. Surveys were distributed by the
ISUE Educator and returned to Iowa State University for analysis. Descriptive analysis was completed using SPSS, version 15.

**Participants**

The target population (n=300) for the survey was the expected number of contacts for the fiscal year for the ISUE Educators as determined by the Director of Families Extension, ISU. Power calculations indicated that a sample size of 96 participants need to be surveyed for each county based on the formula for calculating a one sample of proportions by Cochran (1963) \[ s = \frac{z^2(p(1-p))}{e^2}; \] where \( s \) is the sample size, \( z \) = the number relating to the degree of confidence (95%; 1.96), \( p \) = an estimate of the proportion who will complete the survey (50%, provides the most conservative estimate), and \( e \) = the acceptable proportion of error (10%). Participants of nutrition education sessions held in participating counties were invited to complete the survey at the end of the program. Participants were not compensated for completing the survey.

**RESULTS and DISCUSSION**

**Pre-employment Community Assessment**

Five individual interviews were conducted with African American community leaders (program directors, program managers, and members. Although nutrition is an important aspect of health, the community leaders and community members expressed interest in other topics for education. Major themes included housing and homeownership, teenage pregnancy, and employment.
**Educator Journaling**

The recorded observation of the African American community by the ISUE Educator indicated that unaware of educational services available, but aware that multiple problems exist. As a result of the Community Needs Assessment, the ISUE Educator began working in the community by developing programs identified as necessary by the community leaders and members. These programs included, but were not limited to: a budgeting class with an emphasis on homeownership; working with groups of teen mothers; and Creating Assets for Success and Happiness. The ISUE Educator also provided programs for African Americans that provided nutrition information, in response to a result of a county report detailing the disproportionate amount of African Americans who suffer from diet related diseases. Although diet-related diseases and oral health have been determined to be concerns for the African American Iowa communities, the African Americans in this community did not express either as major health concerns of the community.

The ISUE Educator realized that being African American was not enough to relate to the low-income African American community. Journal entries from the ISUE Educator stated “realized that socio-economic status plays a large role in how we as African Americans view and respond to each other.” Additionally, the ISUE Educator was new to the community, which was also a barrier. The ISUE Educator also noted the presence of racial discord in the community and how her African American clients freely discussed the issue of the segregated community.

The ISUE Educator began recruiting participants for programs using African American churches, which has been recommended in the literature (Agurs-Collins et
al., 1997; Doshi et al., 1994; El-Khorazaty et al., 2007; Fitzgibbon, Stolley, Schiffer, Sanchez-Johnson, Wells, and Dyer, 2005; Gaston et al., 2007; Melkus et al., 2004; Paskett et al., 1999; Resnicow et al., 1999a; Resnicow et al., 1999b). Other methods of making contacts and recruiting African Americans in the community include using a local radio station tailored to African Americans, collaborating with other agencies that serve predominantly African American audiences, and visited local businesses with high African American customer base. Through these efforts, the Educator successfully organized many programs for African Americans in her community.

In the first year of employment, the ISUE Educator was unable to meet the target goals for sequenced programs or one-time contact, but made many connections in the community to collaborate with other help organizations and agencies. The low family contact may be a result of a necessary time of growth and development needed by the Educator (as is needed by all new Educators). In the second year, the Educator made more connections in the community, formed a coalition of African Americans, increased programming, and increased sequenced program and one-time contacts. In the third year, the Educator increased sequenced programming but decreased one-time contacts, and developed and received grant funding for culturally relevant program for African American children, youth, and families.

**Participant Surveys**

Surveys were completed by 56 (10 male; 44 female; 2 respondents did not answer) African American participants from programs offered by the ISUE Educator. About 40% of the participants agree that they would prefer to receive nutrition
information by an Educator of their own race (Graph 1). Forty-one percent strongly agreed to preferring receiving examples about nutrition related to their race. More than three-fourths of the participants agreed to being more comfortable when the educator was of the same race; 30.4% strongly agree, 37.5% agree, and 14.3% slightly agree. Thirty percent of the participants agreed that they enrolled in the program they were in because the educator was African American. Results of the survey indicated that almost 90% of the participants reported a preference for programs designed specifically for African Americans. Although power was not obtained to determine significance, the trends support the need for culturally relevant strategies in nutrition education for African Americans.

Graph 1. Results of survey questionnaire
Post-employment Community Assessment

Five of the ten community leaders and members interviewed before the hiring of the Educator were contacted at the end of the three years via telephone and e-mail completed the interviews. Community members and leaders expressed that they were aware of extension programming in the community; the majority of those interviewed were able to name programs, others were not. The same pattern was indicated when asked about programming in the community specifically for African Americans. The majority of the respondents identified the Extension educator by name, along with the programs implemented by the Educator in the community. Some of the barriers expressed that keep African American families from using the services offered by extension include; accessibility, awareness, trust, income based, and transportation. Some of these same barriers were identified as keeping agencies from working with African American families; other barriers included decreased funding; racism; fees; political barriers, and lack of advertising. Although the community leaders and members could identify programs offered by extension, when asked about referrals, the interviewees did not include extension programs among their list of referrals. Those interviewees most aware of the programming efforts of extension for African American families also discussed the increase in African American participation within their organization.

CONCLUSIONS

Although nutrition related diseases are a major risk factor related to the health of the African American community, other issues may be more important to the
community. Thus, a community assessment is necessary to determine appropriate programming. Additionally, African American Educators new to the community may encounter obstacles when trying to break into the African American community. An overall trend for the preference of culturally relevant strategies was indicated by the program participants. More research is needed in each community to determine preferences of culturally relevant strategies for African Americans in each community by demographic variables.

**STUDY LIMITATIONS**

This case study of one Educator in one community cannot be generalized to all African American communities as this is one educator and one community. Other educators in different areas were hired for comparison, but their employment ended during data collection. Program reporting was also difficult for the Extension educator during the beginning of employment, which may have impact on the number of participant contacts made. Contacting participants in the pre-employment community assessment was a challenge because many of the participants were unable to be reached or changed employment, and one community leader was deceased.
REFERENCES


CHAPTER 4

EDUCATOR AND PARTICIPANT PERCEPTIONS AND COST ANALYSIS OF STAGE-TAILORED EDUCATIONAL TELEPHONE CALLS

A paper published in the Society for Nutrition Education Journal

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ABSTRACT

Objective: To identify strengths and weaknesses of nutrition education via telephone calls as part of a larger stage-of-change tailored intervention with mailed materials.

Design: Evaluative feedback was elicited from educators who placed the calls and respondents who received the calls.

Setting and Participants: Survey responses were collected from 21 of 28 educators in 10 states via an Internet survey and from 50 young adult subjects via telephone. Costs and time estimates were obtained from a lead researcher in each state.

Variables Measured and Analysis: Rankings of intervention components, ratings of key aspects of educational calls, and cost data were summarized via descriptive statistics.

Results, Conclusions and Implications: Educational calls required an average of 15 to 33 minutes to complete with a mean estimated cost of $5.82 per call. Low-income young adults favored print materials over educational calls. However, the
calls were reported to have positive effects on motivating participants to set goals. Educators who use educational telephone calls to reach young adults, a highly mobile target audience, may require a robust and flexible contact plan.

Key Words: Educational telephone calls, Stages of Change, eating behavior change.


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**INTRODUCTION**

Nutrition intervention programs that have attempted to change dietary behaviors are typically more effective in increasing knowledge than changing food choice behaviors (1). As a result, research is needed to identify more effective and practical ways to encourage changes in nutrition behaviors (2). The Transtheoretical Model of Behavior Change (TTM), commonly referred as Stages of Change Model, is a useful model for improving nutrition and other health-related behaviors (3). TTM’s effectiveness is related to the ability to assess an individual’s stage of readiness for making change and subsequently designing educational messages that address individual needs of clients (4).

Stage-tailored and/or interactive educational materials have been effective in initiating and reinforcing behavior change (5-8) but little work has been completed on the cost-effectiveness of stage-tailored educational telephone calls as an adjunct to an educational intervention. Telephone calls used to obtain quantitative food frequencies with widely scattered populations were determined to be less expensive and resulted in higher response rates compared to face-to-face interviews (9-12). Clinical research using telephone calls has proven effective for reinforcing treatment regimens and monitoring patient care (13-16), as well as providing cost-effective education (15, 17-19). Telephone counseling alone has improved functional outcomes among people with chronic medical problems and bridged the communication gap between health care professionals and clients (20). Telephone counseling is increasingly popular as a support for usual clinical care but more conclusive research as to its advantages beyond the clinical setting is needed (21).
Stages of Change Model has been used with both educational materials as well as telephone counseling. However, the combined use of stage-tailored telephone calls with staged-tailored educational materials has not been evaluated, from the perspective of educator and learner. Thus, the primary objectives of this paper are to present: 1) perceptions of nutrition educators who used stage-tailored telephone calls and printed materials to provide nutrition education; 2) perceptions of low-income young adults who received telephone calls and materials; and 3) a cost analysis of the telephone intervention compared to face-to-face educational sessions.

APPROACH

Originally, researchers from 10 states (Alabama, Iowa, Kansas, Maine, Michigan, Nebraska, New York, Oregon, Rhode Island, and Wisconsin) joined forces with extension and outreach colleagues to develop and implement a randomized treatment-control, pre-post study design involving 2025 low-income young adults, ages 18-24, with the intent to increase fruit and vegetable intakes. Details of the intervention protocol, results and outcomes of the original study have been previously described (22, 23). In short, approximately 200 limited income individuals per state were recruited for the original study. Limited income was assumed if the participant or his/her family participated in a public assistance program, or if their self-reported annual income was less than $16,000. Participants completed separate Stage of Change algorithms to measure their motivational readiness to eat 2 servings of fruit or 3 servings of vegetables daily (23) and were randomly assigned to an intervention or control group. The intervention occurred over a period of 6
months during which each young adult in the intervention group received a magazine, 4 newsletters, 2 personalized individual reports, and 2 telephone counseling calls, all of which contained information that was matched to the individual’s assessed stage of readiness for change. Control group participants received a simple educational brochure.

Extension nutrition educators, paraprofessionals, or graduate students in community nutrition (n=28) from each of the 10 states conducted the telephone counseling calls. They received uniform and standardized training in TTM, telephone counseling, and use of the stage-tailored educational materials prior to participating in the educational intervention. Approvals for the project including follow-up assessments were received from the human subjects review boards at the participating universities for this study and informed consent was obtained according to the protocols approved by each university.

**Perceptions of Educators**

To address the objectives of this study, nutrition educators who provided the telephone counseling sessions were contacted via e-mail at 6 months following completion of the intervention. They were asked to respond to a web-based survey to evaluate their experiences in delivering educational messages in telephone counseling sessions. Twenty-one of 28 educators responded, for 75% response rate.

Following the web-based surveys, an educator who made the greatest number of calls from each of the 10 states was recruited via electronic mail to participate in a telephone interview about the educational telephone counseling
experience. Telephone interviews were transcribed and analyzed using Qualitative Data Analysis Software (QSR, version N6, QSR International Pty. Ltd., Melbourne, Victoria, Australia, 2002). In-depth interviews were compared and contrasted with data from the web-based survey.

**Perceptions of Low-income Young Adult Participants**

Participants in the intervention group who indicated they were willing to be contacted following the completion of the intervention (n=550 of 1255 who completed the original study) were used as the recruitment pool for this follow-up study. Six months after completing the intervention a random sample (n=268) was drawn from the recruitment pool and participants were called until the targeted number of 50 completed surveys was reached.

The participant survey was developed for this study, pilot-tested and refined to measure young adults’ preferences for stage-tailored educational approaches used during the study (educational phone calls, newsletters, individualized reports and magazine) according to the Total Design Method recommended by Dillman (24). The participant survey was conducted as a telephone interview with computer data entry assistance. Participants ranked and evaluated the educational materials (see Table 1 for items and response scales). Open-ended questions were used to assess how motivating the materials were to encourage more fruits and vegetables.
Table 1. Ranking and Rating of the Educational Materials by 50 Participant Respondents

<table>
<thead>
<tr>
<th>RANK</th>
<th>Magazine</th>
<th>Newsletter</th>
<th>Report</th>
<th>Calls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Rank 1</td>
<td>17 (34%)</td>
<td>23 (46%)</td>
<td>7 (14%)</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Rank 2</td>
<td>10 (20%)</td>
<td>15 (30%)</td>
<td>12 (24%)</td>
<td>12 (24%)</td>
</tr>
<tr>
<td>Rank 3</td>
<td>4 (8%)</td>
<td>5 (10%)</td>
<td>15 (30%)</td>
<td>12 (24%)</td>
</tr>
<tr>
<td>Rank 4</td>
<td>3 (6%)</td>
<td>2 (4%)</td>
<td>4 (8%)</td>
<td>14 (28%)</td>
</tr>
<tr>
<td>Did not remember receiving</td>
<td>16 (32%)</td>
<td>5 (10%)</td>
<td>12 (24%)</td>
<td>9 (18%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RATING b</th>
<th>Mean ±SD c</th>
<th>Mean ± SD</th>
<th>Mean ± SD</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appealing</td>
<td>1.75± 0.67</td>
<td>1.78± 0.78</td>
<td>2.97± 0.88</td>
<td>-- d</td>
</tr>
<tr>
<td>Interesting</td>
<td>2.21± 0.69</td>
<td>2.09± 0.70</td>
<td>2.00± 0.79</td>
<td>-- d</td>
</tr>
<tr>
<td>Motivating</td>
<td>2.22± 0.60</td>
<td>2.30± 0.73</td>
<td>2.32± 0.84</td>
<td>2.18± 0.60</td>
</tr>
<tr>
<td>Learned something new</td>
<td>2.00± 0.76</td>
<td>1.86± 0.79</td>
<td>2.84± 0.88</td>
<td>2.18± 0.73</td>
</tr>
</tbody>
</table>

Set goals | 2.41± 0.59 |

---

a Participants ranked each of the educational intervention methods that they remembered receiving: 1=top rank to 4=lowest rank
b Participants rated the educational materials they remembered receiving. Scale: 1=Strongly Agree to 4=Strongly Disagree
c Mean ± Standard Deviation.
d These descriptors were not rated for educational telephone calls.
Cost Analysis

Average time to prepare for and make the educational counseling calls, average phone charges, and total cost of educational calls for each educator were calculated using standardized equations (Figure 1). Total number of attempted and completed calls, and average time of preparing for and completing calls were collected from educational call records. Phone charges were based on phone rates for land line, long distance and calling card calls reported by each educator.

Actual costs of the educational calls were compared to hypothetical face-to-face educational sessions using the following assumptions for the hypothetical contact:

1. The time for one complete face-to-face educational session was assumed to be the same as the average overall time of the educational phone call plus 40 minutes for travel (20 mile round trip) and set-up time for the educational face-to-face session. Forty minutes of travel and set-up time was assumed since face-to-face educational sessions typically require travel to a meeting site.

2. Preparation time for the face-to-face educational session was assumed to be the same as the average preparation time for making the educational phone call.

3. The educator’s salary in the hypothetical face-to-face educational contact was the same average salary as educators who made educational phone calls.

4. Mileage costs for travel to the face-to-face educational session with a client was based on an average 10-mile round trip via automobile at $.36/mile.
Equation #1: Time investment of calls

\[
\text{Time investment of calls} = \left[ \frac{\text{hrs (Minutes/60 = time investment in calls to nearest 1/10 of hour)}}{60} \right]
\]

\[
= \text{A} + \text{B} + \text{C}
\]

\[\text{A} = \# \text{of attempted calls} \times 0.5 \text{ min/attempted call}\]
\[\text{B} = \# \text{of completed calls} \times \text{mean time of completed calls}\]
\[\text{C} = \# \text{of recruits who should receive call} \times \text{mean preparation time for the call}\]

Equation #2: Phone charge of educational phone call

\[
\text{Phone charge of educational phone call} = \text{A} \times \text{cost of 1 minute calling time} + \text{B} \times \text{cost of 1 minute calling time}
\]

Equation #3: Total cost of educational phone calls

\[
\text{Total cost of educational phone calls} = \text{Equation #1} \times \text{educator’s salary} + \text{Equation #2}
\]

Equation #4: Average cost of 1 educational phone call for this educator

\[
\text{Average cost of 1 educational phone call for this educator} = \frac{\text{Equation #3}}{\text{total # of completed calls}}
\]

Figure 1. **Cost of educational phone calls: assessment protocol.**

a Equation #1 was rounded to nearest 1/10 of hours; salary cost figured per hour.

b Attempted calls were defined as unsuccessful contacts, including busy signals, unanswered phone calls, reaching a different individual at the respondent’s phone number, and voice mail messages.

c Completed calls were documented when the educator completed at least part of the planned discussion with the intended recipient.

d Preparation time was the time used by an educator to prepare for making educational calls. It included reviewing key information about the call recipient and scanning pertinent educational materials that would be used to support the call conversation.
**Statistical Analysis**

Data were analyzed using the Statistical Package for the Social Sciences (SPSS for Windows, version 14.0, SPSS Inc, Chicago, IL). Descriptive statistics (i.e. frequencies and means) were used to summarize the data. Spearman correlations were used to determine relationships between variables.

**FINDINGS**

*Perceptions of Educators*

Most educators (71%) began conducting their educational calls within 5 weeks of training. Over half of the educators (57%) thought the standardized scripts for the educational calls were well organized; however, about half indicated they deviated from the scripts during educational calls “to make them more personal and not so much like a telemarketer...”

Telephone counseling contacts were not restricted to standard business hours. Nearly 33% of the educators made most of their calls from their worksites or offices and another 33% made most of their calls from home. More than half of the educators (12 of 21) reached their clients within 5 attempts. One in 3 educators used 6 to 10 attempts to reach their clients.

On a 4-point scale from “Not Practical” to “Very Practical,” 66% of educators rated using the telephone for educating clients as somewhat practical (14 of 21), whereas 14% (n=3) indicated it was not practical and 19% (n=4) thought it was quite or very practical. On average, educators thought that 34% of the respondents handled the telephone call in a concise and businesslike manner; 31% were enthusiastic and engaged in the telephone educational session; and 31% were
hurried and distracted. Educators reported that the remaining young adult respondents (4%) were negative or antagonistic to the phone calls.

Educators described the receptiveness of the participants as: “When I was able to contact people, I do feel that people were very receptive” and “… the majority seemed to have interest in being healthier in their eating.” Most of the educators who were interviewed indicated they were comfortable asking for respondents’ time even when they seemed hurried or uninterested. Educators expressed occasional difficulty in reaching this audience as indicated by this statement: “The hardest part is getting an answer to the telephone ring …. They are also a very transient group… don’t stay in one place for very long… phone numbers change regularly.”

During the in-depth interview, common concepts related by the educators were that telephone calls reinforced stage-tailored information from the printed materials and that they liked providing personalized educational interventions. One educator stated, “… you could tailor the telephone calls to what the individual was saying“ Another commented, “… it helped to keep people categorized … you were able to track them and get better outcome as far as how this influenced their changes.”

**Perceptions of Low-income Young Adult Participants**

Similar to the original study, most of the participants were women (72%). Table 1 conveys how participants ranked and rated educational materials they remembered receiving. Newsletters (46%) and magazines (34%) received participants’ top rankings. Young adults who liked the newsletters best thought they were “colorful,” “readable,” and “easy to understand.” Those who preferred the
magazine reported: “It was colorful and I would read it while I was getting dinner ready.” “I like how the information was geared toward a younger crowd; usually health articles are too technical or geriatric.”

Individual reports were a top preference by only 14% (n=7). Comments received about them included: “… I could see how I was progressing…” “I was more likely to read it because it was geared toward me.”

Although 82% remembered receiving educational calls, only 6% (n=3) ranked them as their preferred mode of education. They said that they provided “friendly reminders.” Those who least liked this educational method reported: “I would rather pick up a magazine when I’m bored.” “I work two jobs, so it’s hard to find time to talk” “It was hard to think of questions on the spot.” “A visual is better.” However, respondents who reported setting goals during the call were more likely than those who did not set goals to indicate they learned something new (r=.59; P < 0.001) and were motivated to eat more fruits and vegetables (r=.731; P<.0001).

**Cost Analysis**

The overall average cost of a completed educational phone call was $5.92 (see Table 2) compared to $16.84 for a hypothetical face-to-face contact based on the assumptions and estimates (61.7 minutes for the educational session + preparation time, $12.88 per hour for the educator’s salary, and $3.60 for mileage). Including attempted calls and preparation time, the average amount of time spent on educational telephone calls ranged from 18 to 33 minutes for a completed call.
Table 2. Summary of cost analysis of educational telephone calls by state

<table>
<thead>
<tr>
<th>States</th>
<th>No. Educators</th>
<th>Total Attempted Calls</th>
<th>Total Completed Calls</th>
<th>Average Time for Completed Calls (min)</th>
<th>Average Time to Prepare for Calls (min)</th>
<th>Total Time Spent on All Calls (hours)</th>
<th>Average educator salary/ hour ($/h)</th>
<th>Total Phone Costs of All Calls ($f)</th>
<th>Total Cost of All Educational Calls ($e)</th>
<th>Average Cost per Completed Educational Call ($p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>1</td>
<td>540</td>
<td>135</td>
<td>15.00</td>
<td>10.00</td>
<td>56.25</td>
<td>12.50</td>
<td>1.61</td>
<td>704.73</td>
<td>5.22</td>
</tr>
<tr>
<td>IA</td>
<td>5</td>
<td>399</td>
<td>129</td>
<td>10.00</td>
<td>10.00</td>
<td>53.16</td>
<td>11.38</td>
<td>45.30</td>
<td>650.23</td>
<td>6.04</td>
</tr>
<tr>
<td>KS</td>
<td>2</td>
<td>895</td>
<td>164</td>
<td>9.03</td>
<td>10.00</td>
<td>61.44</td>
<td>13.12</td>
<td>102.73</td>
<td>953.19</td>
<td>5.65</td>
</tr>
<tr>
<td>ME</td>
<td>5</td>
<td>670</td>
<td>150</td>
<td>12.00</td>
<td>16.90</td>
<td>62.91</td>
<td>9.09</td>
<td>75.48</td>
<td>648.90</td>
<td>4.30</td>
</tr>
<tr>
<td>MI</td>
<td>3</td>
<td>232</td>
<td>122</td>
<td>11.50</td>
<td>10.00</td>
<td>56.89</td>
<td>9.07</td>
<td>1.12</td>
<td>533.52</td>
<td>4.27</td>
</tr>
<tr>
<td>NE</td>
<td>3</td>
<td>499</td>
<td>144</td>
<td>8.28</td>
<td>10.00</td>
<td>47.01</td>
<td>17.91</td>
<td>40.25</td>
<td>867.81</td>
<td>6.50</td>
</tr>
<tr>
<td>NY</td>
<td>2</td>
<td>900</td>
<td>156</td>
<td>15.00</td>
<td>15.00</td>
<td>79.00</td>
<td>13.36</td>
<td>97.20</td>
<td>1177.97</td>
<td>7.37</td>
</tr>
<tr>
<td>OR</td>
<td>3</td>
<td>661</td>
<td>130</td>
<td>9.47</td>
<td>6.00</td>
<td>70.57</td>
<td>13.91</td>
<td>1.35</td>
<td>873.95</td>
<td>4.60</td>
</tr>
<tr>
<td>RI</td>
<td>1</td>
<td>512</td>
<td>80</td>
<td>10.35</td>
<td>11.25</td>
<td>35.50</td>
<td>17.29</td>
<td>32.52</td>
<td>646.39</td>
<td>8.08</td>
</tr>
<tr>
<td>WI</td>
<td>3</td>
<td>160</td>
<td>65</td>
<td>7.78</td>
<td>10.00</td>
<td>31.25</td>
<td>17.60</td>
<td>41.63</td>
<td>614.72</td>
<td>9.56</td>
</tr>
<tr>
<td>All</td>
<td>28</td>
<td>5468</td>
<td>1275</td>
<td>10.52</td>
<td>11.20</td>
<td>554.00</td>
<td>12.88</td>
<td>439.04</td>
<td>7671.39</td>
<td>5.92</td>
</tr>
</tbody>
</table>

a Averages in these columns are according to the number of educators who participated in making the calls in that state.

b Total costs of all calls included land line, calling card and long distance charges for all of the educators completing calls in that state.

c Total costs of all educational calls are the sum of the total cost for all educators completing calls in that state.

d Cost per completed educational call was calculated per educator and then averaged for the state.
LESSONS LEARNED

Stage-tailored educational phone calls were a relatively cost-effective component of an intervention that also included mailed individualized reports, stage-tailored newsletters and a magazine, compared to a usual face-to-face educational intervention. Educators and paraprofessionals who delivered stage-tailored educational calls gave positive feedback on the value of the calls. Their challenges tended to be making the scripted outline sound more conversational and experiencing some difficulty contacting participants.

This limited-income young adult population favored the colorful, easy-to-read, stage-tailored print materials more than stage-tailored educational calls. Although individualized reports have been well received in other studies (25, 26), they tended to be less favored than other printed materials for this study, possibly because the newsletters and magazine were more visually appealing. The educational phone calls were less favored by the young adults. However, the quantitative data suggested the calls were motivating for improving fruit and vegetable intake, especially for those who set goals on the phone with the educator. The utility of telecounseling as an adjunct to a tailored, print-based intervention has been mixed (27, 28). It is possible that characteristics of the population and intervention target may affect the efficacy of this intervention modality. Not only stage of change but gender and life stage might affect the efficacy of telephone counseling. Telephone counseling is a more personal approach that some recipients may not appreciate unless self-initiated.
Findings from the educators’ perspectives suggest that stage-tailored educational calls that support mailed educational materials may be a good combination for disseminating nutrition education to low-income adults. The recipients’ perspectives, however, indicate that some challenges remain. Educational phone calls might be an effective follow-up method for adults who perceive themselves to be vulnerable to a chronic disease-related health problem (17). It might not be the most effective way to reach non-symptomatic young adults who consider the telephone a social apparatus. It was often necessary to reach participants during non-standard business hours. When using telephone counseling, flexibility is essential in terms of educator work hours and operational support for making calls from home such as calling cards or work cell phones.

Even so, the cost analyses from this study are consistent with others who have indicated the use of telephone calls to reiterate educational materials is cost effective. Wu et al. (9) showed that tailored telephone counseling interventions were more cost-effective than physician-based and clinic-based interventions to enhance mammography compliance. Similar to a study by Lyu et al. (10), the participants in this study were from many geographic areas across the United States. The present analysis adds credence to the cost-effectiveness of providing information to persons in widely scattered areas.

**Limitations**

This study has several limitations. The study was conducted 6 months after the conclusion of the primary study. The lapse in time between the end of the study and follow-up evaluations, and the fact that lengthy assessment calls were also part
of the intervention study, might have reduced or confused participants’ ability to remember details about various intervention components. Results of this study with young adults may not be generalizable to other groups. These young adults were low income, mobile, seemed to be in transition in life stage, and sometimes hard-to-reach. Although the young adults were randomly selected for the follow-up calls, the pool from which they were drawn was a volunteer pool from the original study and included more females than males. Gender may be a factor in receptiveness to use of phones as educational or informational tools. The cost analysis comparison to usual face-to-face educational sessions was based on assumptions for the defined educational settings in the states involved in this study but may not be appropriate for educational settings in other geographic locations. Further study is needed regarding use of this approach with other adult audiences and for educational versus clinical purposes.

**IMPLICATIONS FOR RESEARCH AND PRACTICE**

Educational phone calls have potential value to reinforce educational messages that are delivered via other means, especially for increasing motivation and encouraging participants to set behavioral goals. However, educators who plan to use this approach with young adult audiences may find it challenging to consistently reach the audience and capture their interest. Furthermore, it may be necessary to make accommodations for contacting this highly-mobile group, such as placing calls during non-business hours.
ACKNOWLEDGEMENTS

The authors acknowledge assistance of (blinded for review), who assisted with development of the web survey for educators and data collection. This project was supported by Initiative for Future Agriculture and Food Systems Grant no. 2001-52102-11226 from the USDA Cooperative State Research, Education, and Extension Service and Agricultural Experiment Stations in the participating states.
REFERENCES


CHAPTER 5
SIMILARITIES AND DIFFERENCES IN STAGES OF CHANGE, SELF-EFFICACY, DEMOGRAPHIC VARIABLES, AND FRUIT AND VEGETABLE CONSUMPTION BY RACE AND RETENTION STATUS

A paper to be submitted to the American Journal of Health Promotion

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ABSTRACT
The purpose of this study was to examine similarities and differences in demographic variables, stages of change, self-efficacy, and fruit and vegetable consumption between the African American and White participants at baseline and completion of an intervention to increase fruit and vegetable consumption in low-income young adults. Higher attrition rates of African American participants were reported previously (Nitzke et al., 2007); this paper reports further analysis of the data by race and retention status. The sample of African American and White participants (n=1877) was obtained from the total data set of participants (n=2042). Results indicate differences in educational and economic status between African American and White participants. Parenthood status and living arrangements also differed between African American and White participants. Environmental differences between retained and non-retained African American participants also exist. Being aware and acknowledging such differences are important determinants of retaining African American participants in behavioral studies.

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INTRODUCTION

Recruitment of minority participants in health research has been a long-standing challenge. To combat this challenge, researchers were urged by the Institutes of Health Revitalization Act (National Institutes of Health Revitalization Act (NIHRA), 1993) to increase minority participation in clinical research more than a decade ago. Yet, relatively few studies provide an analysis of their results by race, which decreases the generalizability of the findings (Corbie-Smith, St. George, Moody-Ayers, & Rnasohoff, 2003). Unfortunately, minority recruitment does not necessarily lead to minority retention (Dunbar-Jacob et al., 2004; Honas, Early, Frederickson, & O’Brien, 2003; Janson, Alioto, & Boushey 2001; Wilbur et al., 2006), a phenomenon less often studied.

Retention strategies are sometimes different and exclusive of recruitment strategies. Even the most successful recruitment strategies do not yield lower attrition rates in minority participants (Wilbur et al., 2006). Researchers conducting various health-related studies report a lower retention for African Americans than Whites (Dunbar-Jacob et al., 2004; Honas et al., 2004; Janson et al., 2001; Wilbur et al., 2006). Some researchers have reported improved retention in African Americans with flexible staff, computer tracking, face-to-face approaches to recruitment, childcare, cultural relevance, incentives, and transportation (El-Khorazaty, 2007; Senturia et al., 1998). The majority of the increased retention strategies appear to be reported in studies specifically for African Americans.

In addition to having a higher rate of attrition, the burden of nutrition related diseases is disproportionately higher in the African American population. African
Americans experience a greater prevalence and decreased survival from many diseases compared to Whites. The Office of Minority Health (2003) reports that African Americans are more likely than Whites to have a stroke (2 times more), to have high blood pressure (1.5 times more), and to have been diagnosed with diabetes (2 times more). African Americans also have the highest mortality rate from all forms of cancer.

Researchers have associated increased fruit and vegetable consumption with a decreased risk of nutrition related diseases. Some studies report that African Americans have lower fruit and vegetable intake than Whites (Krebs-Smith, Cook, & Subar, 1995). Data from the Behavioral Risk Factor Surveillance System (2005) showed that fewer African Americans (23.7%) than Whites (28.6%) reported consuming 3 or more vegetables a day, but a greater percentage of African Americans (35.1%) than Whites (31.2%) reported consuming 2 or more fruits a day. Additionally, individuals with lower incomes and lower educational levels tend to consume fewer servings of fruit and vegetables than individuals with higher incomes and more education (Guthrie, Lin, Reed, & Stewart, 2005). Other cited barriers to increasing fruit and vegetable intake in African Americans are cost, poor cooking skills, lack of social support, childhood eating patterns, availability, perishability, knowledge of choosing good produce, taste, and convenience (Eikenberry & Smith, 2004; Haire-Joshu, Kreuter, Holt, & Steger-May, 2004; Yeh et al., 2008). Thus, persistent and applicable educational approaches are needed to increase fruit and vegetable consumption in low-income African Americans.
Theory-based behavioral intervention studies have been used for nutrition interventions to change health-related behaviors. The Transtheoretical Model (TTM), a model based on an individual's readiness to change, has been adapted from smoking cessation studies to changing food choice behaviors. TTM is composed of 4 constructs (the stages of change (SOC), decisional balance, self-efficacy, and processes of change) (Di Noia, Schinke, Prochaska, & Contenko, 2006; Green & Rossi, 1998; Prochaska & Velicer, 1997). The first construct, SOC, which identifies five stages through which individuals move to make a change, has been used in many studies of health-related interventions. The five stages are described as precontemplation (no intention to change behavior), contemplation (thinking about making a change, but not within the next month), preparation (intending to take action within the next month), action (modify behavior to overcome problem for 3-6 months), and maintenance (sustained new behavior 6 months–5 years). Individuals move or skip through the stages of change forwards or backwards. Positive results have been cited using SOC in studies designed for reducing fat intake (Auslander et al., 2002; Campbell, et al., 1994; Hargreaves et al., 1999), increasing fruit and vegetable intake (Campbell et al., 1994; Di Noia et al., 2006; Krueter et al., 2005; Richards, Kattlemann, & Ren, 2006) and the use of mammography (Krueter et al., 2005) in interventions designed specifically for African Americans. The decisional balance construct is the perceived benefits and barriers to change. The self-efficacy construct is the confidence in an individual's ability to make a necessary change. The processes of change construct are activities and experiences that occur during the behavior change process (Olsen, Jason, Ferrari, & Hutcheson, 2005). The ten
processes of change are consciousness raising (CR) *knowledge that a problem exists*, counterconditioning (CC) *finding alternatives for the problem behavior*, dramatic relief (DR) *having feelings about the problem and the solution*, environmental reevaluation (ER) *awareness of the problem behavior on the physical and social environment*, helping relationships (HR) *using and building relationships to change the problem behavior*, reinforcement management (RM) *rewards for making a change in the problem behavior*, self-liberation (SL) *choice and commitment to change the problem behavior*, self reevaluation (SR) *individual reconsideration of problem behavior*, social liberation (SL) *awareness of how to remove the problem behavior*, and stimulus control (SC) *controlling situations that promote the problem behavior* (http://www.uri.edu/research/cprc/TTM/ProcessesOfChange.htm). Decisional balance, self-efficacy, and processes of change are less often evaluated in nutrition interventions.

The purpose of this study was to analyze data from a multi-state (AL, IA, KS, ME, MI, NE, NY, OR, RI, WI) collaboration to develop, test and implement a randomized control, pre-post study design to increase fruit and vegetable consumption in low-income (income less than $16,000 or participation in a public assistance program) 18-24 years old young adults using the TTM constructs. The study reported that 49% of African American participants compared to 33% of White participants did not complete the intervention ($\chi^2(df=1)=, p<.001$) (Nitzke et al., 2007). Further analysis was conducted to examine similarities and differences between the African American and White participants at baseline and completion of
the intervention within the SOC, processes of change, self-efficacy, demographic variables, and fruit and vegetable consumption.

**Approach to intervention**

The intervention lasted 6 months and included a 12-month follow-up. Participants were recruited through known low-income programs using posted ads and personal contacts (Nitzke et al., 2007). Control group participants received an educational brochure. The experimental group received a magazine, 4 newsletters, 2 personalized individual reports, and 2 educational calls, all of which contained information that was matched to the individual's assessed stage of readiness for change. Data were collected at three time points (baseline, 4 months, 12 months) from participants using a stage of change algorithm to assess the participants' readiness to eat 2 servings of fruit or 3 servings of vegetables, a questionnaire was developed using a five-point Likert scale to assess processes of change and self efficacy, and an open-ended question was used to assess fruit and vegetable consumption (Nitzke et al., 2007).

The newsletters were tested with young adults in individual or small group interviews in each of the participating states and the transcripts were audiotaped and transcribed for qualitative analysis (n=246) (Ruud et al., 2005). Results indicated that the stage-tailored newsletters were acceptable by the young adults. The personalized individual reports were computer-generated and provided feedback about decisional balance, self-efficacy, and stage-specific behavior change processes. Educational phone calls were conducted by paraprofessionals (from each of the 10 states) who received standardized training in SOC, telephone
counseling, and use of the stage-tailored educational scripted materials prior to conducting the educational telephone calls. A more detailed description of the intervention protocol has been previously described (Nitzke et al., 2007).

**Methods**

The sample (n=1877) of African American and White participants was obtained by removing participants of other ethnicities from the final data set (n=2042) in the multi-state intervention to increase fruit and vegetable consumption. The race/ethnicity consisted of 1.7% Asian, 2.9% American Indian, 3% Other, 11% Hispanic, 27% African American, and 54% White (Nitzke et al., 2007). The recruitment efforts were successful in oversampling African Americans participants; the US population is 14% African American (US Census Bureau, 2007). The distribution of African American participants was significantly different between states; 39% of African Americans were recruited from Alabama. Baseline and completion data were analyzed for African American and White participants who enrolled and completed all three data collection points, and are referred to as retained participants (n=1170). Non/not-retained participants (n=707) describes the number of participants who were enrolled, but did not complete either of the three data collection points. The final data set included demographics, fruit and vegetable consumption, and variables of the TTM constructs for all 10 states, which was analyzed by race and level of completion (retained and not retained).
**Statistical Analysis**

The data set was split by race and level of completion using the Statistical Package for the Social Sciences (SPSS), version 15 (Chicago, IL). Descriptive statistics were used to examine all variables. The Pearson’s chi-square test was used to determine relationships between categorical data by race and stage distributions for fruits and vegetables within the experimental group at baseline and 12 months. Effect size for categorical data was measured using the odds ratio. Independent *t*-tests were used to compare means of fruit and vegetable consumption, self-efficacy, and processes of change variables between all African American and White participants at baseline, between African American and White participants who were retained in the intervention at baseline, between African American and White participants who were not retained in the intervention at baseline, and between African American participants who were and were not retained in the intervention. A logistic regression analysis was used to explore retention between African American and White participants using demographic variables and stages of change classification at baseline.

**RESULTS**

*All African American and White Participants at Baseline*

**Demographics**

Differences in demographic variables between African American and White participants existed at baseline (Table 1) of the intervention; significant differences existed between the races with respect to level of education, age, monthly income and living arrangements. A higher percentage of African Americans (22%) than
Whites (15%) reported having less than a high school diploma, and more of the (p<0.001) African Americans (49%) than Whites (40%) reported having no college education. Although there was an emphasis on the recruitment of low income individuals, more of the (p<.001) African Americans (73%) earned less than $800/month, compared to Whites (55%).

There were also significant associations for age between African American and White participants, as well as living arrangements and being a parent. More than 40% of the African American participants were under 20 years of age, whereas only 25% of the White participants were under 20 years of age. Additionally, a higher percentage of African Americans than Whites reported being parents, 34% and 28% respectively. Accordingly, a higher percentage of the African American participants (52%) than White participants (43%) reported living with children. Sixty-five percent of the White participants reported living with others compared to 53% of the African American participants.

Logistic regression using all demographic variables for both races identified, race, gender and level of education as significant factors of retention. The same model identified level of education as a retention factor for African American participants; gender and being responsible for food preparation emerged as factors predicting retention of African American participants as well. The only factor in predicting retention among the White participants was educational level. When the stages of change classification at baseline for fruits and vegetables was added to the model, the stage of change classification for fruit and vegetable consumption was a significant factor in predicting retention for African American participants, but
not White participants. Gender and educational level remained significant factors, but responsibility for food preparation was not significant for African American participants.

**Fruit and Vegetable Consumption**

Significant differences between African American and White participants regarding fruit and vegetable consumption at baseline were observed (Table 2). A significant association existed between race and average fruit ($p<0.01$), and combined fruit and vegetable ($p<0.01$) consumption; African American participants reported consuming more servings of fruit per day than White participants ($2.19±1.51$ vs. $1.98±1.36$). The average vegetable serving per day was lower for African American than White participants ($1.56±1.11$ vs. $1.70±0.94$).

**Stages of Change**

The distribution of participants among the stages of change categories (precontemplation, contemplation, preparation, action, and maintenance) at baseline were determined to be significantly different (Graph 1) between African American and White participants ($p<0.01$). The analysis between African American and White participants indicate that more of the African Americans than Whites were classified in the maintenance (M) stage for fruit consumption (63\% vs. 57\%) and the preparation (P) stage for vegetable consumption (45\% vs. 30\%). Following this same pattern, when the stages-of-change were categorized into 2 groups, pre-action (precontemplation, contemplation, and preparation) and post-action (maintenance and action), African Americans were significantly ($p<.01$) more likely to be classified
in post-action for fruit consumption ($x^2_{1df}=11.815, p<.01$), and pre-action for vegetable consumption ($x^2_{1df} = 9.90, p<.01$) (Table 3).

**Processes of Change and Self-Efficacy**

Processes of change variables for fruit and consumption between all African American and White participants entering the intervention were not significant. Significant associations between race and self liberation and reinforcement management for fruit consumption were observed; White participants had a higher average for self liberation for fruit consumption than African American participants, and African American participants had a higher average for reinforcement management for fruit consumption. There was a significant association between race and the processes of change variable for vegetable self reevaluation; African Americans had higher averages for vegetable self reevaluation. The self efficacy average for fruit consumption was significantly higher for the African American participants than for the White participants; however, the self efficacy average for vegetable consumption between African American and White participants was not significantly different.

**Retained African American and White Participants**

**Demographics**

Most of the demographic variables between retained participants were associated with race (Table 1). Like the results from all of the African American and White participants at baseline, there were significant associations between race and age, level of education, and monthly income ($p<.001$) within the participants who were retained in the intervention at baseline by race. African American participants
were younger (25% vs. 14%), had lower income (monthly income less than $800; 70% vs. 53%), and had a lower level of education (less than high school; 21% vs. 10%) than their White counterparts. Additionally, a higher percentage of the African Americans than Whites reported living with parents (50% vs. 39%) and/or living with children (50% vs. 40%). A lower percentage of the African Americans than Whites reported living with others (52% vs. 65%).

**Fruit and Vegetable Consumption**

A significant association between race and average daily fruit and vegetable intake was observed at baseline, 4 months, and completion between African American and White participants (Table 2). African American participants reported consuming more fruit than White participants at baseline (2.18±1.47 vs. 1.93±1.32), 4 months (2.20±1.50 vs. 1.97±1.23) and completion (2.41±1.58 vs. 1.90±1.18). African American participants reported consuming less vegetables than White participants at baseline (1.53±1.12 vs. 1.70±.91), 4 months (1.49±.99 vs. 1.75±.93), and completion (1.53±1.12 vs. 1.75±.92).

Additionally, both African American and White participants increased average daily fruit consumption, as well as combined fruit and vegetable consumption by the end of the intervention (Table 2). The average daily vegetable consumption for African American participants remained consistent for all three data collection points. In contrast, an increase in the average vegetable consumption by White participants was observed.
Stages of Change

There was a significant difference in stage distribution proportions between African American and White participants for fruit and vegetable stage of change at baseline. A higher percentage (p<.001) of the African Americans than Whites were classified in the maintenance stage for fruit consumption at baseline, 65% and 56% respectively (Graph 2). For vegetables, the majority of the participants were classified in the preparation stage; however, a higher percentage (p<.001) of African Americans (44%) than Whites (27%) were in the preparation stage (Graph 3). Additionally, when the stages of change were categorized into pre-action and post-action, African Americans were significantly (p < .01) more likely than White participants to be classified in post-action for fruit consumption (83% and 80%) and pre-action for vegetable consumption (80% and 71%) (Table 3).

Following the pattern of the baseline data, a higher percentage of African American than White participants were classified in the maintenance stage for fruit consumption (62% vs. 57%) and the preparation stage for vegetable consumption(47% vs. 27%) consumption. At four months, African Americans (77%) were significantly (p < .001) more likely than Whites (65%) to be classified in pre-action for vegetable consumption but there was no significant difference in fruit consumption classification.

An association between race and stage of change was also determined at intervention completion. A higher percentage of the African American than White participants were classified in the maintenance stage for fruit (Graph 2) consumption (62% vs. 60%) and the preparation stage for vegetable consumption (42% vs. 30%)
(Graph 3). Although more of the African American (77%) than White (75%) participants were categorized in post-action for fruit consumption at completion, the difference was not significant. Likewise, a higher percentage of African American (71%) than White (67%) participants tended to be categorized in pre-action for vegetable consumption at completion; again, the difference was not significant.

**Processes of Change and Self-Efficacy**

Fruit and vegetable processes of change between African American and White participants were not significantly different at baseline (Table 7). At completion, African American participants for vegetable conscious raising was higher than that of White participants; counterconditioning was lower for African American participants than that of White participants. Fruit consumption self efficacy was higher for African American than for White participants at baseline, but not at completion. There were no significant differences in vegetable self efficacy at baseline or completion between African American and White participants who were retained in the intervention.

**Non-Retained African American and White Participants at Baseline**

Significant associations were determined between African American and White participants that were not retained in the intervention (Table 1). A greater percentage ($p=0.001$) of African Americans reported an income of less than $800, 76% of African American participants compared to 58% of White participants. Additionally, a greater percentage of White participants (66%) than African American participants (55%) reported living with others ($p<0.01$). All other demographic variables between African American and White participants who were not retained in
the intervention were not significantly different. Additionally, there were no significant associations between baseline data of African American and White participants who were not retained and average daily fruit and vegetable consumption (Table 2). Additionally, there were no significant differences between race and the combined total consumption of fruits and vegetables.

**African American Participants by Retention Status and Intervention Group**

**Demographics**

There are some distribution differences between the African Americans who were retained and African Americans who were not retained in the intervention (Table 4). Analysis of the comparison of African Americans who were and were not retained in the intervention indicated significant associations between retention and being a parent \( (p<.05) \), living with parents \( (p<.05) \) and being responsible for own food \( (<.05) \). A lower percentage of retained than non-retained African American participants were parents \( (27\% \text{ vs. } 38\%) \). About 50\% of the retained participants reported living with parents compared to about 40\% of the non-retained participants. Lastly, a higher percentage of the retained \( (64\%) \) than non-retained \( (36\%) \) African Americans reported responsibility for their own food. There were no significant associations between age, educational level or income level within the African American participants.

**Fruit and Vegetable Consumption**

There were no significant differences between fruit, vegetable or total fruit and vegetable consumption between African Americans who were retained in the intervention and African Americans who were not retained in the intervention at
baseline (Table 5). At four months, the average daily fruit and vegetable consumption between the experimental and control groups for those retained in the intervention were determined to be significantly different (Table 5); the experimental group had higher average fruit, vegetable, and combined fruit and vegetable consumption than the African American participants in the control group. At completion, African Americans in the experimental group had a significantly higher average of fruit consumption than those in the control group. There were no significant differences in vegetable or combined fruit and vegetable consumption between the intervention groups at completion.

**Stages of Change**

There were no differences in fruit or vegetable stage distribution proportions for African American participants who were or were not retained in the intervention or between intervention group (experimental vs. control) at baseline. At completion, vegetable stage distribution proportions between groups were determined to be significantly different; more African Americans in the experimental group (31%) than in the control group (22%) were classified in the maintenance stage (Table 3).

**Processes of Change and Self Efficacy**

The averages for fruit consumption reinforcement management (RM) and stimulus control (SC) were significantly different (p<.05); the averages for RM and SC were higher for those who were not retained than for those who were retained at baseline. There were no significant differences in the averages for the processes of change variables for vegetable consumption, as well as for fruit or vegetable self efficacy.
DISCUSSION
Analyses from this study support the results from other studies in concluding that African Americans have higher attrition rates (Dunbar-Jacob et al., 2003; Janson et al. 2001; Wilbur et al., 2006). The use of culturally relevant strategies has been shown to increase retention in African American participants. Kanders and colleagues (1994) used trained African American group leaders, ethnic foods, group support sessions, and culturally based lifestyle education program in a successful weight-loss program for working class African American women. Ninety-one percent of the participants completed the program and attended more than 8 of the 10 scheduled sessions. Similarly, Melkus et al. (2004) reported a 90% attendance rate in group interventions and 100% attendance rate for nurse practitioner care visits in a pilot test testing the feasibility of a culturally sensitive intervention of education and care for African American women with type 2 diabetes. This study also provided African American lay health assistants along with culturally relevant recipes, written materials and videotapes. Conversely, a study using a behavioral construct coupled with culturally relevant tailoring reported non-differential attrition by study group in African American women (Kreuter, 2005). The determinants of attrition vary, and require additional attention to help decrease the disproportionate rate of diet related diseases.

The newsletters and magazines provided as part of the intervention were well-received by a sample of predominately low-income (56%) White (67%) females (65%) (Ruud, 2005). Although the messages in the newsletters and magazines were tailored for a specific stage of change, they were not tailored for race or culture, like
most multi-race interventions. The pictures and recipes for the fruits and vegetables displayed in the newsletters and magazine did not use fruits and vegetables commonly eaten by African Americans, which could explain the consistent average of vegetable consumption by African American participants. Research from Kreuter and colleagues report that a theoretical model coupled with cultural tailoring increases effectiveness in diverse populations. Other researchers, provide evidence that implementing culturally relevant strategies increases retention in African American participants (Anderson, Beresford, Lampe, Knopp, & Knopp, 2007; El-Khoratzy et al., 2007; Kanders et al. 1994; Krueter et al., 2005).

Although Nitzke and colleagues (2007) recruited low-income individuals, the data shows that the African American participants had a lower yearly income, and lower educational level than White participants. These findings are consistent with national reports that African Americans are more socially and economically disadvantaged than Whites (.). Low income and lower educational status have both been associated with increased attrition in health research studies() and are confounding factors of differences in fruit and vegetable consumption, as well as retention. Thus, continued research is needed to determine ways to increase retention in low-income, low-educated African Americans.

Other important issues that may relate to retaining African American participants include the different strategies used during the processes of change to increasing fruit (vegetable) consumptions. Some social and environmental factors were more important to increasing fruit and vegetable intake for African American participants that were retained in the intervention. Relationships and awareness of
increasing fruit were important for African Americans in increasing fruit consumption. The White participants reported using more methods to redirect things that triggered not eating more vegetables than the African American participants. The African American participants reported using more positive reinforcement for eating more vegetables than the White participants.

CONCLUSIONS

Low retention of African American participants is not only a problem in clinical research, but in behavioral research studies as well. The differences between race and retention status are related to demographics (both economical and education); however, the differences among African American participants (retained vs. non-retained) are more related to environment (i.e., parenthood status, living arrangements). Thus, the development and implementation of nutrition programs that address environmental issues may help increase retention of African American participants. Although there were few differences in the processes of change variables, it is important to note that some cognitive differences exist in increasing vegetable consumption in African Americans and should be considered for future program development.

LIMITATIONS

This study has several limitations. The study recruited more than one-third of the African American participants from the Southeast region of the US, and the remaining participants from the Midwest or Northeast regions. The difference in geographic locations might have contributed to the differences in demographic characteristics. The data should be further analyzed by geographic location.
Graph 1. Baseline Stages of Change for All African American and White Participants. Legend Key; PC- Precontemplation, C- Contemplation, P- Preparation, A- Action, M- Maintenance. There is a significant association between race and fruit (vegetable) baseline stage of change (Fruit: $x^2(df=4)=21.04$, $p<.001$; vegetable: $x^2(df=4)=44.06$, $p<.01$); determined by crosstabulations.
Graph 2. Fruit Stages of Change for Retained African American and White Participants. Legend Key: PC- Precontemplation, C- Contemplation, P- Preparation, A- Action, M- Maintenance. There is a significant association between race and fruit baseline stage of change (Baseline: $x^2(df=4)=21.67, p<0.001$; Completion: $x^2(df=4)=11.02, p<0.05$) as determined by crosstabulations.
Graph 3. Vegetable Stages of Change for Retained African American and White Participants. Legend Key; PC- Precontemplation, C- Contemplation, P- Preparation, A- Action, M- Maintenance. There is a significant association between race and vegetable stage of change (Baseline: $x^2(df=4)=24.65, p<.001$; Completion: $x^2(df=4)=20.20, p<.001$) as determined by crosstabulations.
Table 1. Demographic Characteristics of African American and White Participants

<table>
<thead>
<tr>
<th></th>
<th>BASELINE (n=1877)</th>
<th>COMPLETE (n=1170)</th>
<th>NON-RETAINED (n=707)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>African American</td>
<td>White</td>
<td>p-value&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>(n=552, 29.4%)</td>
<td>(n=1325, 70.6%)</td>
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</tr>
<tr>
<td>Age</td>
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<tr>
<td>18</td>
<td>132 (23.9)</td>
<td>215 (16.2)</td>
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</tr>
<tr>
<td>19</td>
<td>103 (18.7)</td>
<td>251 (18.9)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>104 (18.8)</td>
<td>188 (14.2)</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>67 (12.1)</td>
<td>183 (13.7)</td>
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<tr>
<td>22</td>
<td>58 (10.5)</td>
<td>156 (11.8)</td>
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<tr>
<td>23</td>
<td>49 (8.9)</td>
<td>207 (15.6)</td>
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</tr>
<tr>
<td>24</td>
<td>39 (7.1)</td>
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<td>Gender</td>
<td></td>
<td></td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Female</td>
<td>346 (62.7)</td>
<td>801 (54.6)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>206 (60.5)</td>
<td>524 (39.5)</td>
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<tr>
<td>Monthly income before taxes</td>
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<td>&lt;800</td>
<td>394 (72.8)</td>
<td>715 (54.6)</td>
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<tr>
<td>801-1200</td>
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<td>38 (7)</td>
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<td>&gt;1600</td>
<td>10 (1.8)</td>
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Table 1 (continued). Demographic Characteristics of African American and White Participants

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<th>BASELINE (n=1877)</th>
<th>COMPLETE (n=1170)</th>
<th>NON-RETAINED (n=707)</th>
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<tr>
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<td>African American</td>
<td>White</td>
<td>p-value</td>
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<tr>
<td></td>
<td>(n=552, 29.4%)</td>
<td>(n=1325, 70.6%)</td>
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<tr>
<td>Education</td>
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<td>&lt;High School</td>
<td>123 (22.3)</td>
<td>200 (15.1)</td>
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<td>High School</td>
<td>150 (27.5)</td>
<td>331 (25)</td>
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<td>Diploma/GED</td>
<td>239 (43.4)</td>
<td>578 (43.7)</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>23 (4.2)</td>
<td>91 (6.9)</td>
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<td>2-year degree</td>
<td>14 (2.5)</td>
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<tr>
<td>4-year degree</td>
<td>2 (.4)</td>
<td>5 (.4)</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>degree</td>
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<td></td>
</tr>
<tr>
<td>Living Arrangements</td>
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<td></td>
</tr>
<tr>
<td>With parents</td>
<td>252 (45.7)</td>
<td>509 (38.4)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>With others</td>
<td>296 (53.6)</td>
<td>862 (65.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With children</td>
<td>289 (52.4)</td>
<td>570 (43)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Are you:</td>
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<td>Pregnant</td>
<td>27 (28.4)</td>
<td>68 (71.6)</td>
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</tr>
<tr>
<td>Breastfeeding</td>
<td>16 (30.8)</td>
<td>36 (69.2)</td>
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</tr>
<tr>
<td>Parent</td>
<td>185 (33.5)</td>
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</tr>
<tr>
<td>Responsible for food prep</td>
<td>466 (84.4)</td>
<td>1149 (86.7)</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

^aChi-square analysis level of significance between demographic variables and race. ^bNS indicates Not Significant (p > 0.05). ^cMore than one living arrangement was possible. ^dRepresents all African American and White participants at baseline. ^eRepresents all African American and White participants who were retained in the intervention. ^fRepresents all African American and White participants who were not retained in the intervention.
**Table 2. Mean Fruit and Vegetable Intakes as Servings/Day Via 5 A Day Screener**

<table>
<thead>
<tr>
<th></th>
<th>Servings/Day All Participants at Baseline (M±SD)</th>
<th>Servings/Day Non-Retained Participants at Baseline (M±SD)</th>
<th>Servings/Day Baseline (M±SD)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Servings/Day 4 months (M±SD)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Servings/Day Completion (M±SD)&lt;sup&gt;a&lt;/sup&gt;</th>
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<tbody>
<tr>
<td><strong>Fruit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>(n=547) 2.19±1.51</td>
<td>(n=266) 2.20±1.54</td>
<td>(n=281) 2.18±1.47</td>
<td>(n=283) 2.20±1.50</td>
<td>(n=282) 2.41±1.58</td>
</tr>
<tr>
<td>White</td>
<td>(n=1321) 1.98±1.36</td>
<td>(n=435) 2.08±1.45</td>
<td>(n=886) 1.93±1.32</td>
<td>(n=883) 1.97±1.23</td>
<td>(n=885) 1.90±1.18</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>&lt;.01</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>&lt;.01</td>
<td>&lt;.01</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Vegetable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>(n=552) 1.56±1.11</td>
<td>(n=269) 1.60±1.09</td>
<td>(n=283) 1.53±1.12</td>
<td>(n=283) 1.49±.99</td>
<td>(n=281) 1.53±1.12</td>
</tr>
<tr>
<td>White</td>
<td>(n=1321) 1.70±.94</td>
<td>(n=436) 1.69±.99</td>
<td>(n=885) 1.70±.91</td>
<td>(n=887) 1.75±.93</td>
<td>(n=885) 1.75±.92</td>
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<tr>
<td><strong>p-value</strong></td>
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<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>&lt;.001</td>
<td>&lt;.01</td>
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<tr>
<td><strong>Combined</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>(n=547) 3.75±2.15</td>
<td>(n=266) 3.80±2.21</td>
<td>(n=281) 3.70±2.10</td>
<td>(n=283) 3.70±2.10</td>
<td>(n=281) 3.93±2.25</td>
</tr>
<tr>
<td>White</td>
<td>(n=1317) 3.66±1.94</td>
<td>(n=433) 3.75±2.07</td>
<td>(n=884) 3.62±1.88</td>
<td>(n=883) 3.73±1.83</td>
<td>(n=883) 3.65±1.77</td>
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<tr>
<td><strong>p-value</strong></td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>Mean and standard deviation is based on fruit and vegetable intake by the number of African American and White participants that were retained in the intervention.

<sup>b</sup>NS indicates Not Significant (p > .05)
Table 3. Stages of Change Categorized

<table>
<thead>
<tr>
<th></th>
<th>Fruit</th>
<th>Vegetable</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>African American</td>
<td>White</td>
<td>p-value&lt;sup&gt;a&lt;/sup&gt;</td>
<td>African American</td>
</tr>
<tr>
<td><strong>Stage-of-Change Categorized at Baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Action&lt;sup&gt;c&lt;/sup&gt;</td>
<td>99 (18%)</td>
<td>334 (25%)</td>
<td>&lt;.01</td>
<td>427 (79%)</td>
</tr>
<tr>
<td>Post-Action&lt;sup&gt;d&lt;/sup&gt;</td>
<td>452 (82%)</td>
<td>985 (75%)</td>
<td></td>
<td>117 (21.5%)</td>
</tr>
<tr>
<td><strong>Stage-of-Change Categorized at Baseline (Retained)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Action&lt;sup&gt;c&lt;/sup&gt;</td>
<td>47 (16.6%)</td>
<td>239 (27.1%)</td>
<td>&lt;.01</td>
<td>225 (80.1%)</td>
</tr>
<tr>
<td>Post-Action&lt;sup&gt;d&lt;/sup&gt;</td>
<td>236 (83.4%)</td>
<td>644 (72.9%)</td>
<td></td>
<td>56 (19.9%)</td>
</tr>
<tr>
<td><strong>Stage-of-Change Categorized at Completion (Retained)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Action&lt;sup&gt;c&lt;/sup&gt;</td>
<td>64 (23%)</td>
<td>226 (25%)</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>201 (71%)</td>
</tr>
<tr>
<td>Post-Action&lt;sup&gt;d&lt;/sup&gt;</td>
<td>219 (77%)</td>
<td>660 (75%)</td>
<td></td>
<td>81 (29%)</td>
</tr>
<tr>
<td><strong>Stage of Change Categorized of those Not Retained</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Action&lt;sup&gt;c&lt;/sup&gt;</td>
<td>52 (19%)</td>
<td>95 (22%)</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>202 (77%)</td>
</tr>
<tr>
<td>Post-Action&lt;sup&gt;d&lt;/sup&gt;</td>
<td>216 (81%)</td>
<td>341 (78%)</td>
<td></td>
<td>61 (23%)</td>
</tr>
<tr>
<td><strong>African American Participants Stage of Change Categorized by Retention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retained</td>
<td>Not Retained</td>
<td>Retained</td>
<td>Not Retained</td>
<td></td>
</tr>
<tr>
<td>Pre-Action&lt;sup&gt;c&lt;/sup&gt;</td>
<td>47 (17%)</td>
<td>52 (19%)</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>225 (80%)</td>
</tr>
<tr>
<td>Post-Action&lt;sup&gt;d&lt;/sup&gt;</td>
<td>236 (83%)</td>
<td>216 (81%)</td>
<td></td>
<td>56 (20%)</td>
</tr>
</tbody>
</table>

<sup>a</sup>Chi-square analysis level of significance for relationship between stages of change categorized and race and retention status.

<sup>b</sup>NS indicates Not Significant (p > .05)

<sup>c</sup>Combined stages of precontemplation, contemplation and preparation.

<sup>d</sup>Combined stages of maintenance and action.
Table 4. Demographics of African American Participants by Retention Status at Baseline

<table>
<thead>
<tr>
<th>Sample (552)</th>
<th>Retained No. (%)</th>
<th>Not retained No. (%)</th>
<th>p-value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=282, 51.2)</td>
<td>(n=269, 48.8%)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>71 (25.1)</td>
<td>61 (22.7)</td>
<td>NS&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>19</td>
<td>49 (17.3)</td>
<td>54 (20.1)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>63 (22.3)</td>
<td>41 (15.2)</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>38 (13.4)</td>
<td>29 (10.8)</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>27 (9.5)</td>
<td>31 (11.5)</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>18 (6.4)</td>
<td>31 (11.5)</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>17 (6.0)</td>
<td>22 (8.2)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>Female</td>
<td>190 (67.1)</td>
<td>156 (58)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>93 (32.9)</td>
<td>113 (42)</td>
<td></td>
</tr>
<tr>
<td>Monthly income before taxes</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>&lt;800</td>
<td>192 (69.8)</td>
<td>202 (75.9)</td>
<td></td>
</tr>
<tr>
<td>801-1200</td>
<td>58 (21.1)</td>
<td>41 (15.4)</td>
<td></td>
</tr>
<tr>
<td>1201-1600</td>
<td>21 (7.6)</td>
<td>17 (6.4)</td>
<td></td>
</tr>
<tr>
<td>&gt;1600</td>
<td>4 (1.5)</td>
<td>6 (3.3)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>&lt;High School</td>
<td>58 (20.6)</td>
<td>65 (24.2)</td>
<td></td>
</tr>
<tr>
<td>High School Diploma/GED</td>
<td>66 (23.4)</td>
<td>84 (31.2)</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>139 (49.3)</td>
<td>100 (37.2)</td>
<td></td>
</tr>
<tr>
<td>2-year degree</td>
<td>13 (4.6)</td>
<td>10 (3.7)</td>
<td></td>
</tr>
<tr>
<td>4-year degree</td>
<td>5 (1.8)</td>
<td>9 (3.3)</td>
<td></td>
</tr>
<tr>
<td>Post graduate degree</td>
<td>1 (.4)</td>
<td>1 (.4)</td>
<td></td>
</tr>
<tr>
<td>Living arrangements&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With parents</td>
<td>141 (49.8)</td>
<td>111 (41.3)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>With others</td>
<td>147 (51.9)</td>
<td>149 (55.4)</td>
<td>NS</td>
</tr>
<tr>
<td>With children</td>
<td>142 (50.2)</td>
<td>147 (54.6)</td>
<td>NS</td>
</tr>
<tr>
<td>You are…</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnant</td>
<td>12 (6.3)</td>
<td>15 (9.6)</td>
<td>NS</td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>11 (5.8)</td>
<td>5 (3.2)</td>
<td>NS</td>
</tr>
<tr>
<td>Parent</td>
<td>81 (28.6)</td>
<td>104 (38.7)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Responsible for food preparation</td>
<td>228 (64)</td>
<td>238 (36)</td>
<td>&lt;.05</td>
</tr>
</tbody>
</table>

<sup>a</sup>Chi-square analysis level of significance between demographic variables and race.

<sup>b</sup>NS indicates Not Significant (p > .05)

<sup>c</sup>More than one living arrangement was possible.
### Table 5. Average Fruit and Vegetable Consumption as Servings/Day Via 5 A Day Screener for African American Participants by Intervention group and Retention Status

<table>
<thead>
<tr>
<th>Group</th>
<th>Servings/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline (M±SD)(^a)</td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>2.25±1.54</td>
</tr>
<tr>
<td>(n=137)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>2.11±1.41</td>
</tr>
<tr>
<td>(n=144)</td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>NS(^b)</td>
</tr>
<tr>
<td>Vegetable</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>1.56±1.09</td>
</tr>
<tr>
<td>(n=138)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>1.51±1.15</td>
</tr>
<tr>
<td>(n=145)</td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>NS(^b)</td>
</tr>
<tr>
<td>Combined</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>3.79±2.10</td>
</tr>
<tr>
<td>(n=137)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.62±2.10</td>
</tr>
<tr>
<td>(n=144)</td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>NS(^b)</td>
</tr>
</tbody>
</table>

\(^a\)Mean and standard deviation is based fruit and vegetable intake by the number of African American and White participants that were retained in the intervention.

\(^b\)NS indicates Not Significant (p ≥ .05)
REFERENCES


CHAPTER 6
GENERAL CONCLUSIONS

Although African Americans are no longer the largest minority group in the United States, the African American community continues to face the greatest burden of the incidence and prevalence of diet related chronic diseases (Office of minority health, 2007). Developing, implementing, and evaluating nutrition education programs specific to the needs of the African American community may curb the effects of diet-related chronic diseases and increase the retention rate of African Americans in nutrition education programs.

The uses of culturally relevant strategies have been shown to increase the retention of African American participants in research studies (El-Khorazaty et. al., 2007; Kanders et al., 1994; Krueter et al., 2005). This research demonstrated that an African American educator new to a predominantly White community can successfully gain the trust of the African American community, collaborate with other agencies and organizations to implement programs, and develop culturally tailored programs. African American educators who are new to the community may experience some of the same barriers as White educators who are employees in the community when working with the African American community, but may gain quicker access and trust to the African American community. In the multi-state study the African American educator was not enough to retain African Americans in the intervention at the same rate as the White participants. Thus, the use of multiple
culturally relevant strategies may be more effective in retaining African American participants in nutrition education programs.

In the evaluation of adding an African American educator to an urban community with a higher percentage of African Americans than the state average, but lower than the national average, our findings indicated that program participants expressed the desire for more culturally relevant programming for African Americans by extension. Participants also expressed preference to culturally relevant strategies to receive nutrition education materials. These findings are similar to reports of successful retention strategies detailed by other researchers (El-Khorazaty et al., 2007; Senturia, Mortimer, Baker, Gergen, Mitchell, Joseph, and Wedner, 1998). Although this was not studied in the multi-state collaboration to increase fruit and vegetable consumption in young adults, the lack of culturally relevant strategies may be a factor of the increased attrition of African American participants. Even in a sample of low-income young adults, differences in educational level and income level between African American and White participants exists and should be considered as factors of retention when providing nutrition education for African American participants.

Educators are an important factor in providing effective nutrition education; however, there is a lack of published data regarding perceptions of educators to theory based educational interventions to change health behaviors. Using theory-based scripts for training and as guides for telephone interviews, the educators of the multi-state program thought using the telephone was a good combination for disseminating nutrition education for both African American and White participants.
The African American church was also a viable source for recruiting program participants for the new educator, as well as the multi-state educator, as acknowledged in other studies (Anderson et al., 2007; Doshi et al., 1994; Hargreaves et al., 1999; Paskett et al., 1999; Paskett, DeGraffinreid, Tatum, and Margitic, 1996; Resnicow, 2001). With the steady increase in transportation costs, telephone calls may prove to be the most cost effective way to disseminate nutrition education for outpatient, as well as community education.

**FUTURE RESEARCH CONSIDERATIONS**

- Additional research is needed to determine the impact of providing nutrition education to African Americans living in areas with small percentages of African Americans in the community.
- Further examination of the perceived need of implementing culturally relevant strategies in nutrition education programs of African Americans. A study of such should include a higher number of participants and utilize visual aids. A scale to determine the level of cultural relevance should be used to develop and describe the educational materials.
- Nutrition education is not a one-size-fits-all model. This research indicates the need for research to determine factors that affect retention within the African American population. Nutrition education programs should tailor material and sessions based on income, gender, economic status, parenthood status, and living arrangements.
• More research is needed regarding educator perceptions of models and theories used to develop and disseminate nutrition education material, as well as comparisons of educator and student perceptions of the effectiveness of nutrition education materials.
APPENDIX A

Pre-employment Assessment

1. What type of help programs are available in your community?

2. What agencies offer help for African Americans in your community?

3. What current community issues are the most important for African American residents?

4. Which diseases or conditions affect the African American community the most?

5. Which services are offered by extension? Specifically for African Americans?

6. What services are needed for African American residents?

7. Where do you refer African American clients to most often?
APPENDIX B
Post-employment Assessment (at the end of the 3\textsuperscript{rd} fiscal year of employment)
1. What opportunities/services does extension offer?
2. What programs in your community were guided specifically for African Americans in your community?
3. What barriers keep African American families from using services and opportunities offered by extension?
4. What services do you refer African American clients to most often?
5. What barriers keep an agency from working with African American families?
APPENDIX C

Educator Journal Outline
1. Briefly describe any lessons learned from the African American (i.e. needs, accessibility, perceived attitude)

2. How many programs, specifically for African Americans/ Hispanics, have you conducted? (include title of program and number of clients served)

3. What are you doing to make the African American/Hispanic community aware of your services?

4. How can the agency make your position more workable in the community?

5. Please share in “Ah-ha” moments about yourself that may have occurred this past week.

6. Please share in “Ah-ha” moments about the community that may have occurred this past week.
## APPENDIX D

**Survey**

<table>
<thead>
<tr>
<th>Gender: □ Female □ Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age:</td>
</tr>
<tr>
<td>Race:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1. I would prefer to receive information by an Educator of my race.</th>
<th>□ Agree</th>
<th>□ Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Strongly</td>
<td>□ Slightly</td>
<td>□ Strongly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. I prefer receiving examples related to my race.</th>
<th>□ Agree</th>
<th>□ Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Strongly</td>
<td>□ Slightly</td>
<td>□ Strongly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. I am most comfortable when the educator is of my race.</th>
<th>□ Agree</th>
<th>□ Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Strongly</td>
<td>□ Slightly</td>
<td>□ Strongly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. I enrolled in this program because the educator was a member of my race.</th>
<th>□ Agree</th>
<th>□ Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Strongly</td>
<td>□ Slightly</td>
<td>□ Strongly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. I would participate if more Extension programs were designed for my race.</th>
<th>□ Agree</th>
<th>□ Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Strongly</td>
<td>□ Slightly</td>
<td>□ Strongly</td>
</tr>
</tbody>
</table>
REFERENCES


telephone-based, personalized behavior change support service result in favorable changes in lipids and lifestyles after 7 weeks. *J Am Diet Assoc.*, 102, 503-510.


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ACKNOWLEDGEMENTS

Thank you to Drs. Mary Jane Oakland, Deland Myers, Ruth Litchfield, Ruth MacDonald, Grace Marquis, Lois Wright Morton and Mack Shelley for your tireless efforts in helping me to continue to grow as a professional and matriculate through my program of study. I am forever grateful to each of you for your guidance, recommendations, and support. I would also like to thank the Department of Food Science and Human Nutrition for the opportunity to ascertain one of my professional goals. Last but not least, I would like to thank my family and friends for their continuous patience, words of encouragement and love; for without them, I would not be who I am. A special thanks to Shanna, Laila, and Jada for giving me time out of their lives to accomplish this goal.