

SCRIPA, IOANA, Ph.D. Development and Implementation of Nutrition Education Classes and Cooking Sessions into an Existing Life Skills Program for Young Mothers at the YWCA of Greensboro, NC (2012)
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The overall aim of this two-part study was to develop and implement nutrition education classes and cooking sessions that would improve nutrition knowledge, cooking knowledge, self-efficacy towards cooking and healthy eating, and food choices of adolescent and young adult mothers. The project used a convenience sample of mothers enrolled in the Teen Parent Mentor Program (TPMP) and the Healthy Moms Healthy Babies program (HMHB) at the YWCA of Greensboro, NC. Due to the small sample size, quantitative results are not presented in this document. This dissertation focuses on the development and implementation of the nutrition education classes and cooking sessions into an existing life-skills program at the YWCA.

A community-based participatory research approach was used to partner with the YWCA to identify personal, environmental, and behavioral factors that influence the food choices of adolescent and young adult mothers enrolled in their life-skill programs. Ten adolescent (TPMP) mothers and 10 young adult (HMHB) mothers were interviewed individually to compare and contrast their knowledge and attitudes toward healthy eating, cooking/shopping practices, and food choices in order to develop relevant nutrition education interventions for this target audience. Both groups gave simple definitions for “healthy” versus “unhealthy eating,” and mothers reported that limited resources affected their practices of “cooking at home”. Only 50% of participants reported eating breakfast, but the majority reported eating lunch and dinner.

Based on those interviews, seven nutrition education and cooking classes were developed and incorporated into the YWCA life-skills program Being Your Best Self designed for adolescent (TPMP) young adult (HMHB) mothers. The program was better received by the young adult mothers than adolescent mothers, as they appeared more attentive during the classes and interacted more with the student researcher who delivered the classes. The YWCA staff reported that the classes were successfully incorporated into their existing program and that this “program within a program” supported their goals of having mothers learn healthy eating information and food preparation skills. Nutrition interventions with young mothers that creatively improve knowledge and skills to help them make healthier food choices for themselves and their children can be incorporated into existing programs offered to this high-risk population.

DEVELOPMENT AND IMPLEMENTATION OF NUTRITION EDUCATION
CLASSES AND COOKING SESSIONS INTO AN EXISTING LIFE
SKILLS PROGRAM FOR YOUNG MOTHERS AT
THE YWCA OF GREENSBORO, NC

by

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TABLE OF CONTENTS

	Page
LIST OF TABLES	vii
LIST OF FIGURES	viii
CHAPTER	
I. INTRODUCTION	1
Primary Aims	2
Secondary Aims.....	4
II. LITERATURE REVIEW	6
Diets of at-risk pregnant or parenting women	6
Diets of teenagers	7
Socio-economic status influences dietary intake of African American adolescents.....	8
Barriers to healthy eating in adolescents.....	10
Family meals and snacking have a positive influence on the diet of teenagers.....	14
The impact of health literacy, socio-economic status, and race on the health care of children and adolescents.....	17
Social Cognitive Theory of Behavior Change.....	20
Nutrition education benefits for adolescent mothers/pregnant adolescents.....	25
Nutrition education benefits for low-income pregnant or parenting adult mothers	28
Improvements in the dietary habits of mothers have a positive impact on the dietary habits of their children.....	30
Community-based participatory research.....	32
Primary Investigator Experience	35
Preliminary results from Nutrition Education (NTR) 607 class, spring 2008.....	35
Preliminary results from NTR 601 class, spring 2009.....	36
Theoretical Basis for the Project	37
References	41

III. HEALTHY EATING KNOWLEDGE AND BELEIFS, COOKING/ SHOPPING PRACTICES, AND FOOD CHOICES OF ADOLESCENT AND YOUNG ADULT MOTHERS ENROLLED AT THE YWCA OF GREENSBORO	49
Abstract.....	49
Introduction	50
The YWCA: a promising setting for community-based health interventions	52
Methods	54
Background on the partnership with the YWCA	54
Participant recruitment.....	55
Data collection	55
Data analysis	56
Results	57
Participant characteristics	57
Key themes from participant narratives.....	58
Personal beliefs about healthy eating.....	58
Environmental influences on cooking/shopping practices	60
Food choices throughout the typical weekday.....	62
Discussion.....	63
Implications	68
References	70
IV. DEVELOPMENT AND IMPLEMENTATION OF NUTRITION EDUCATION CLASSES AND COOKING SESSIONS INTO AN EXISTING LIFE-SKILLS PROGRAMS AT THE YWCA OF GREENSBORO, NC	77
Abstract.....	77
Introduction	78
Planning phase.....	80
The YWCA: a promising setting for health-interventions.....	80
The CBPR approach	82
Conceptual framework.....	83
Methods	85
Intervention description	85
Education materials.....	87
Participant recruitment.....	87
Data collection	88

Data instruments	88
Data analysis	90
Results	90
Participant characteristics	90
Nutrition education classes and cooking sessions observation data	91
Posttest and follow-up evaluation of the program	93
Staff evaluation of the nutrition education classes and cooking sessions	94
Discussion.....	96
Conclusion.....	101
References	103
V. EPILOGUE	108
APPENDIX A: CONSENT FORMS FOR PRELIMINARY STUDY.....	114
APPENDIX B: CONSENT FORMS FOR MAIN STUDY.....	121
APPENDIX C: SUPPLEMENTARY TABLE 7.....	131
APPENDIX D: SUPPLEMENTARY TABLE 8.....	136
APPENDIX E: PRELIMINARY STUDY QUESTIONNAIRE.....	139
APPENDIX F: QUESTIONNAIRES FOR INTERVENTION PROGRAM.....	146
APPENDIX G: SUPPLEMENTARY TABLE 9.....	170
APPENDIX H: SUPPLEMENTARY TABLE 10.....	172

LIST OF TABLES

	Page
Table 1. Program Situation: Nutrition Education and Cooking Classes Logic Model.....	40
Table 2. Demographic characteristics.....	74
Table 3. Meal patterns of mothers who participated in meal pattern timeline interviews	75
Table 4. Reported food choices of mothers [(n/%)]	76
Table 5. Class topics and activities	106
Table 6. Demographic characteristics (mean \pm SE).....	107

LIST OF FIGURES

	Page
Figure 1. Social Cognitive Theory explaining current situation of adolescent and young adult mothers.....	38
Figure 2. Proposed model explaining a program for adolescent and young adult mothers.....	105

CHAPTER I

INTRODUCTION

Some single limited-income pregnant and parenting women and their children are at risk for inadequate nutritional intake and other health consequences during and after pregnancy (Moran, 2007; Giddens et al., 2000; Pobocik et al., 2003; Haire-Joshu et al., 2011). Nutrition inadequacy has been also reported among pregnant teenagers, who were consuming below the Dietary Reference Intakes (DRI) for calcium, iron, vitamin E and many other micronutrients (Moran, 2007; Giddens et al., 2000; Pobocik et al., 2003). Low-income women are likely to be limited in their ability to buy and eat healthy foods during pregnancy, which can result in delivery of low-birth weight infants (Fowles et al., 2011). Even after the baby's birth, low-income adolescent mothers may put themselves at risk for nutritional inadequacy by not consuming breakfast on a regular basis (Haire-Joshu et al., 2011).

A number of interventions have been conducted to improve the dietary intake of adolescent mothers and pregnant teenagers. Some of these interventions included nutrition education and were able to improve the pregnancy outcomes of the adolescents, such as shorter hospital stays and fewer low-birth weight infants (Dubois et al., 1997; Hunt et al., 2002). Other interventions delivered a series of cooking classes from which the adolescents were able to make positive skills/ behavior changes in nutrition and food resource management practices and improved dietary intake (Owen, Kendall, and

Wilken, 1997; Long, Martin, and Janson-Sand, 2002). Nutrition interventions have also been conducted with pregnant or parenting low-income adult women, and these studies were successful at increasing energy and macronutrient intake, along with delivery of higher birthweight infants (Widga and Lewis, 1999; Briley, Flanagan, and Lewis, 2002). Parents can also act as agents of dietary change in their young children (Klohe-Lehman et al., 2007; Epstein et al., 2001). Therefore, improving nutrition knowledge, cooking skills, and dietary practices of mothers can benefit not only their health but also the dietary practices and health of their young children.

This study was designed to assess the effect of nutrition education classes and cooking sessions on nutrition knowledge, cooking knowledge, self-efficacy towards cooking and healthy eating, and dietary intake of adolescent (TPMP) and young adult mothers (HMHB) enrolled in life-skills classes at the YWCA of Greensboro. However, due to the small sample size of the intervention study group, quantitative results are presented in the Appendix of this document. The two research articles (Chapters III and IV) describe the development of seven nutrition education classes and cooking sessions that were designed to be incorporated into an existing life-skill program for adolescent and young adult mothers at the YWCA of Greensboro, along with benefits of delivering such a program in this context of a “program within a program”.

Primary Aims

Aim 1: Describe, using the Social Cognitive Theory framework, the personal, behavioral, and environmental factors that influence healthy eating of adolescent

and young adult mothers participating in life skills programs at the YWCA of Greensboro.

Research question: How can the Social Cognitive model be used to understand the dietary behaviors and factors which influence those behaviors among adolescent and young adult mothers?

Approach: In depth one-on-one interviews were conducted with adolescent and young adult mothers to explore the personal, behavioral, and environmental factors that influence their food choices and meal patterns.

Aim 2: Develop assessment tools for adolescent and young adult mothers that are relevant to the goals of the nutrition education classes and cooking sessions and can be used at pretest, posttest, and follow-up time points of the study.

Research question: Will the questionnaires developed for this study to measure nutrition knowledge, cooking knowledge, and self-efficacy be valid and reliable among adolescent and young adult mothers?

Approach: Following the identification of specific topics for the nutrition education classes and cooking sessions, the research team created pretest, posttest, and follow-up questionnaires to match the topics allocated. All instruments were pilot tested to ensure item clarity and appropriate literacy levels, subject test-retest assessments, and validated using content experts.

Aim 3: Develop a process evaluation protocol to assess the effectiveness of a pilot intervention program to improve dietary behavior among adolescent and young adult mothers using the Social Cognitive Theory framework.

Research question: Will this protocol help the researchers to determine which components of the intervention were associated with outcomes and which were not?

Approach: Concepts that are part of process evaluation were investigated and questionnaires were created to address the particular concepts that are related to the study. Tools were developed to assess participation rates (mean number of sessions attended), maintenance rates (percentage of participants who maintain participation to a point in time), fidelity of the program (quality of delivery of the program), dose (fidelity x extent), reach of the program (how much of the information presented was received by participants), barriers (problems encountered in reaching participants), exposure (did participants view or read materials that were handed to them), and continual use (did participants continue to do use the information provided through the program).

Secondary Aims

Aim 1: Compare nutrition knowledge, cooking knowledge, and self-efficacy towards cooking and eating healthy from pretest to posttest to follow-up between the two groups of mothers (adolescents versus young adults).

Research question: Are there differences among the two groups of mothers in terms of nutrition knowledge, cooking knowledge, and self-efficacy regarding cooking and healthy eating after participation in the nutrition education classes and cooking sessions?

Approach: The participants completed nutrition knowledge, cooking knowledge, and self-efficacy questionnaires at pretest, posttest, and follow-up time points of the study.

Aim 2: Compare food choices from pretest to posttest to follow-up between the two groups of mothers (adolescents versus young adults).

Research question: Are there differences among the two groups of mothers in terms of dietary changes following participation in the nutrition education classes and cooking sessions?

Approach: Participants completed a Meal Pattern Timeline questionnaire at the three time points in the study. The mothers were asked to describe their usual dietary intake to form a better picture of typical meal patterns. Also, three 24-hour recalls were administered, one at each data collection time point.

CHAPTER II

LITERATURE REVIEW

Diets of at-risk pregnant or parenting women

Some single limited-income pregnant and parenting women and their children are at risk for inadequate nutritional intake and other health consequences during and after pregnancy (Moran, 2007; Giddens et al., 2000; Pobocik et al., 2003; Haire-Joshu et al., 2011). Pobocik and colleagues (2000) investigated a group of 434 pregnant adolescents, ages 14-20 years old, and discovered that 80% of this group had mean intakes below the EAR for folate, vitamin E, and magnesium. Also, 63% of adolescents had iron intakes that were 75% below the RDA. Moran (2007) conducted a review of nine cross-sectional studies that included pregnant 13 to 20 years olds and found that the mean nutrient intakes that most often fell below the DRI for these women were energy, iron, folate, calcium, vitamin E, and magnesium. Last, Giddens and colleagues (2000) compared the dietary intake of 57 pregnant adolescents to the intake of 97 pregnant adults and found that the energy intake was below the recommended value of 2,500 kcal/day for both groups. Also, mean intakes of calcium, magnesium, zinc, iron, folate, fiber, and vitamins E and D were below the reference values, while mean consumption of thiamin, niacin, riboflavin, and vitamin B-6, B-12, and A exceeded the recommended values for both groups. Even after the baby's birth, Haire-Joshu and colleagues (2011) found that low income adolescent mothers may put themselves at risk for nutritional inadequacy by not

consuming breakfast on a regular basis. These authors found that 42% of 904 postpartum teens consumed breakfast fewer than two days per week. See Appendix-Table 7 for additional studies.

Pregnant adults are also at risk for nutritional inadequacies. Hurley and colleagues (2005) examined 134 pregnant women and found that the majority of these women did not consume adequate iron, folate, and fiber, and over-consumed protein and fats. The authors also found that women who reported dealing with stress, anxiety, and fatigue had higher consumption of carbohydrates, fats, and proteins. Fowles and colleagues (2011) also reported that in a sample of 118 pregnant low-income women, distress (depression and stress) had a direct effect on the poor dietary intake of their participants, along with direct and indirect effects on their dietary quality.

These studies indicate that at-risk pregnant or parenting adolescent or adults can have poor diets, which in turn can have a negative effect on their health. Being low-income or dealing with distress during pregnancy can be related to the poor habits mentioned above. Planning nutrition interventions with such populations should take these issues into account.

Diets of teenagers

Diets of adolescents have been steadily changing since the 1960's with many factors involved in this change, including shifts in the types of products consumed (whole-fat milk vs. low-fat milk or raw fruit vs. fruit juice), decreased consumption of fruits and vegetables, and decreased intake of breakfast, along with increased

consumption of fast-food, sugar-sweetened beverages, and meals eaten away from home. Table 6 offers a summary description of research conducted in this area (see Appendix).

Socio-economic status influences dietary intake of African American adolescents

Several studies show that SES influences the dietary habits of African American teenagers. Hurley and colleagues (2008) compared the Healthy Eating Index (HEI) and the Youth HEI (YHEI) scores between two groups of low-income African American teenagers. Participants included 196 adolescents enrolled in the Challenge trial and 121 African American teenage mothers who were part of the Three Generation Project. The Challenge study was a longitudinal, randomized control trial whose main purpose was to endorse healthy dietary patterns or activity patterns in middle school students. The purpose of the Three Generation project was to promote positive parenting practices among young mothers. For both groups of participants, consumption of fiber and calcium were below the recommendation for this age group. Also, many adolescents had BMI values that were higher than what is suggested. Sixty six percent of participants in the Challenge group had a BMI \geq 85th percentile versus 92 % in the Three Generation group. The Three Generation group had a lower HEI score compared to the Challenge group because they were consuming more total fat, cholesterol, and sodium. The authors conclude that the diets of both groups of adolescents put them at risk for chronic disease later in life (Hurley et al., 2008).

Wang and colleagues (2007) investigated the incidence of overweight and related risk factors in 458 low SES urban African American students enrolled in grades 5-8 at four Chicago schools. Forty percent of the participants were at risk for overweight and

22% were overweight. Fifty seven percent of students stated they dislike the taste of healthy foods. Consumption of fruits and vegetables was low, with only 53.4% reporting eating fruits more than twice times a day, and 45.2% consuming vegetables more than twice per day. Consumption of fried foods was popular among this group, with 55.1% of participants stating they eat fried foods more than twice per day and 19.5% eating such food four or more times per day. Seventy percent of the students consumed soda twice or more per day, while 22.0% drank soda four or more times per day. The authors concluded that these dietary habits may increase the risk of developing obesity and a number of chronic diseases among these adolescents.

Arcan and colleagues (2009) examined the dietary practices of 145 students from six alternative high schools from Minneapolis/St Paul, MN. The racial distribution was 39% white, 32% African American, and 29% other, with 64% classified as low SES. African American students were 2.6 times more likely to consume sports drinks one or two times per week and three times more likely to drink other sugar-sweetened beverages \geq three to four times per week than their white counterparts. The same group was more than three times more likely to consume something from a fast-food restaurant \geq three to four times per week and they also ate more high-fat foods more frequently than white students. Soda consumption was higher among the high SES group versus the low SES group. The authors concluded that the students from these alternative high schools reported generally unhealthful dietary habits.

Low income is associated with poor dietary habits of African American adolescents and is cited as a factor working against healthy eating in this particular

population. These teenagers consume below the recommended amounts of calcium and fiber and have higher rates of being overweight. African American adolescents also report a high intake of fried foods, fast food, and sugar-sweetened beverages coupled with low consumption of fruits and vegetables.

Barriers to healthy eating in adolescents

Several studies have examined potential barriers to healthy eating in adolescents. Stevenson and colleagues (2007) investigated the possible conceptual, physical, individual, developmental and social barriers to healthy eating by conducting focus groups with 73 adolescents, ages 12 to 15 years old. Four major themes resulted as the explanation for barriers reported by participants regarding healthy eating. Under the first theme, influences of food choices, many teenagers reported that taste, smell, texture, and appearance were important in choosing particular foods to eat. The second theme, the balanced diet, perceptions of food and eating behavior, described the foods liked or disliked. Preferred foods included burgers, chips, pizza, chocolate, and sweets. Disliked foods included fruits, vegetables, unprocessed meat, and seafood. Their definition of “healthy eating”, was based on the elimination of unhealthy foods. For the third theme, perception of contradictory messages, the teenagers complained that their parents, the media, and school support the consumption of foods that are unhealthy, while at the same time, the media promote conflicting images of thinness as the ideal figure for girls. With the last theme, conceptual issues: healthy eating and perceptions of dieting, participants saw healthy eating as a temporary solution to the problem of obesity, instead of a long term answer. The authors concluded that many factors act as barriers to healthy eating

for teenagers, which vary from personal and cognitive ones to peer, parental, and media influences.

Neumark-Sztainer and colleagues (1999) assessed adolescent opinions about factors that influence their food choices and eating behavior using 141 males and females enrolled in 7th and 10th grade in St. Paul, Minnesota. The participants were divided into 21 focus groups, with 4 to 11 students per group. Following focus group data analysis, three central questions emerged: 1) why do adolescents eat what they eat, 2) what are the perceived barriers to following the recommended dietary guidelines, and 3) what would make it easier for adolescents to eat more healthful foods. Hunger and food cravings, appeal of the food (mostly taste), time considerations, convenience of food (how easy is it to prepare or to find that particular food), parental influence on eating behavior, beneficial effects of foods, mood, body image, habits, cost, media, and vegetarian beliefs were all reported. Most participants stated that eating healthful foods was not a priority. Fruits, vegetables, and dairy products were reported to not taste good. Schools and fast-food restaurants were perceived to not promote healthy foods or to not make them available or appealing to students. The authors concluded that to improve the diets of adolescents, particular attention needs to be placed on environmental factors, such as promoting availability of appealing and convenient foods within homes, schools, and restaurants.

O'Dea (2003) investigated why children and adolescents eat healthful foods and engage in physical activity, using 38 focus groups with students from second through 11th grade (n=213). One reported barrier was the convenience of choosing less healthful

alternatives instead of healthful ones when at home. Another barrier was internal/physiologic preferences: participants crave and prefer the taste of unhealthy foods, and these foods offer more satiety than the healthy ones. The third barrier was social reinforcement such as peer pressure, parental control over food, and lack of parental/ school support and modeling. The last barrier was reward driven/mood enhancement such as treating oneself with unhealthful foods. Participants stated that they ate when they were bored or emotional, to relieve stress. O'Dea concluded that it is important to teach children and adolescents the many benefits of healthy eating and exercising and to help them understand the importance of such benefits.

Similar results were reported by Kubic and colleagues (2005), who investigated factors that influence the dietary and physical activity of teenagers attending an alternative high school in St. Paul, Minnesota. Seventy students participated in focus group discussions, with 7-12 students per group. The students preferred “quick and easy to prepare” foods. Taste, food cravings, and habit influenced food choices. The majority of students reported consuming “free foods” such as cookies and donuts. Access to fruits and vegetables was challenging, and participants stated that they would eat such foods if they were available and their consumption was encouraged at both school and home. The authors stressed the importance of decreasing the consumption of unhealthy foods by adolescents.

One major barrier that prevents adolescents from eating healthy foods and recommended amounts of nutrients is the increased consumption of fast food. Sebastian and colleagues (2009) conducted a study to determine whether fast food consumption by

teenagers is related to both mean intakes of MyPyramid food groups and the percent of participants meeting MyPyramid recommendations. A total of 1,956 adolescents, ages 12-19 years old, provided two complete days of dietary data collected using the multiple-pass method for the 24-hour recall. Fast food contributed a mean 17% of total energy intake in boys and 16% in girls. For boys, the percentage of total calories from fast food was negatively associated with milk and fruits consumption. The same was observed with girls' consumption of fruits and milk. Girls who ate more fast food also had a higher intake of discretionary calories and saturated fat. The authors concluded that fast food consumption among teenagers must be considered when trying to improve the dietary intake of this group.

Paeratakul and colleagues (2003) also conducted a study that examined fast-food consumption and diet quality. A total of 1,796 participants, ages 10-19, were included in the study. Participants who reported eating fast food consumed significantly lower amounts of bread and cereals, fewer dark green vegetables and other vegetables, and less fruits and juices, milk, and legumes. Additionally, consumption of chicken, meat mixtures, potatoes, and carbonated soft drinks increased significantly in participants who consumed fast food. These authors concluded that fast food consumption contributes to a poor diet.

Based on these studies, adolescents report they do not prefer eating healthy foods for several reasons including their perception that such foods do not taste as good as the unhealthy alternatives and their appearance also makes them unattractive; healthy foods are not readily available in schools, fast-food places, or their homes; peer pressure to

consume unhealthy foods; receiving no encouragement from parents or other authority figures to consume healthy foods. Fast-food consumption has become increasingly popular among this population, and by eating such meals, adolescents fail to achieve optimal intakes of fruits and vegetables. There is a clear need for creative interventions that aim to promote the consumption of healthy foods among adolescents. Such interventions should include unique ways of making consumption of fruits and vegetables easy and fun, along with ways of decreasing fast food consumption among teenagers.

Family meals and snacking have a positive influence on the diet of teenagers

Even though adolescents face a number of barriers in terms of having more healthful diets, a number of factors can have a positive influence on their dietary intake, such as family meals. A total of 1,710 young adults, with a mean age of 20.4 years, participated in the Project EAT-II study (Larson et al., 2007). To compare changes in dietary habits, data from the same individuals collected during Project Eat-I was also used. During EAT-I, 18.6 % of the adolescents were consuming seven or more family meals per week. EAT-I family meal frequency was positively correlated with EAT-II daily consumption of fruit, vegetables, and dark-green and orange vegetables. Teenagers who ate seven or more family meals per week were consuming roughly 0.7 extra servings of fruits and vegetables per day. Also, greater family meal frequency during EAT-I was associated with higher intakes of calcium, magnesium, potassium, and fiber at EAT-II among the teenagers. The authors concluded that the practice of eating more family meals during adolescence is linked to better dietary intake during young adulthood.

Similar results were reported by Videon and colleagues (2003) who investigated the result of parental influences on teenager's consumption of fruits, vegetables, dairy foods, and breakfast using a total of 18,177 adolescents, enrolled in grades 7 through 12. The participants were asked if they ate specific foods for breakfast, and how frequently they ate fruits, vegetables, and dairy foods the previous day. They were also asked if parents let the adolescents make their own decisions regarding the foods they consume. Parent education was positively associated with lower odds of poor consumption of fruits, vegetables, and dairy products. Adolescents who were permitted to make decisions about food consumption were more likely to skip breakfast. Teenagers who consumed six or seven meals per week together with their family had lower odds of skipping breakfast and poor vegetable, fruit, and dairy product consumption than those who consumed only four or five family meals. The authors concluded that family meals have a significant influence on teenage consumption of breakfast, fruit, vegetables, and dairy products.

Snacking can also positively influence the dietary intake of adolescents. Sebastian and colleagues (2008) conducted a study to determine how snacking affects total nutrient intake and food group choices in adolescents using 4,357 teenagers, ages 12-19 years. As snacking frequency increased, so did intake of carbohydrates and sugar, while protein and fat intake decreased. For teenage boys, consumption of vitamin A, vitamin E, and magnesium rose significantly with snacking. For both genders, vitamin C increased significantly. For both genders, intake of fruit and snacking increased, while consumption of solid fat (butter, margarine, full-fat animal products, and processed

foods) decreased. The authors concluded that even though snacking enhanced intakes of some vitamins and the likelihood of meeting the fruit recommendations, these food choices needed to be improved.

Frary and colleagues (2004) examined the link between consumption of key nutrients and food groups by all major food and beverage sources of added sugar. This study included 1,125 adolescents, aged 12-17 years, who completed 2 days of dietary recalls using the multiple-pass 24 hour recall approach. As the consumption of sweetened dairy products (flavored milk, flavored yogurt, ice cream, and pudding) and pre-sweetened cereals rose, the intake of calcium increased significantly. Intake of iron rose significantly with the consumption of presweetened cereal. Saturated fat intake decreased as more sweetened dairy products were consumed. As the adolescents ate more sugar and sweets, the number of vegetable servings decreased by one-half or more. Fruit intake also decreased by one serving as the teens consumed more sugar-sweetened beverages. Participants consuming a high amount of sweetened dairy and pre-sweetened cereal had the highest number of dairy servings per day. The authors concluded that overall, consumption of sweetened dairy products and pre-sweetened cereal had a positive result on the diets of adolescents.

Family meals and snacking have positive influences on the dietary intake of adolescents. Interventions that target dietary modifications for adolescents should encourage the adolescents to eat more meals with their families and increase their intake of healthy snacks throughout the day.

The impact of health literacy, socio-economic status, and race on the health care of children and adolescents

A number of factors influence the health outcomes of children and adolescents. Low literacy can have a negative impact on dietary intake, such as incorrect estimation of portion sizes and misreading food labels (Rothman et al., 2006; Huizinga et al., 2009). Poor health literacy has a negative impact on both parents' and children's health. According to Yin and colleagues (2009), 90 million US adults have limited health literacy. Risk factors associated with low health literacy include low socioeconomic status, limited English speaking abilities and racial/ethnic minority group classification (Kutner et al., 2006). Based on this information, Yin and colleagues conducted a study to assess the health literacy of US parents at a national level. Subjects included 6100 parents with children from a sample of the 2003 National Assessment of Adult Literacy, who were tested on health literacy and self-report of child related issues, and who were compared with a group of non-parenting adults. Parents were more likely to be younger and to have an income below the poverty threshold. Parents who had less than a high school education had greater than eight times the odds of experiencing low health literacy. Also, being low income and belonging to the Black and Hispanic race/ethnicity was significantly related to low health literacy. Participants with low literacy had 3.4 times the odds of having difficulty understanding over-the-counter medication labels. Lower parent health literacy was significantly associated with having a child without medical insurance. In terms of nutrition, parents with lower health literacy were more likely to state that they never use the food label. The authors concluded that a large

percentage of parents in the US display inadequate health literacy which impacts their children's health.

DeWalt and Hink (2009) conducted a review of studies that focused on the association between literacy and child health outcomes. A total of 13 studies were part of this review and some of the inclusion criteria were that they had to measure literacy among participants, and measure child health outcome or caregiver behavior directly related to child health. Seven studies stated that their findings show that people with lower literacy had less comprehension of health outcomes, behaviors, and health services. One study found that mothers with low literacy were less likely to continue breastfeeding for more than two months. Another study found that children of parents with low literacy are more likely to have moderate to severe persistent asthma and miss more school days due to illness instead of children of parents with higher literacy levels. The authors conclude that low parental literacy is linked to poorer child health outcomes. Sanders and colleagues (2009) reported similar results to the ones presented in the review above, but they also determined that low literacy of caregivers is linked to poor child nutrition. After analyzing a number of studies, they found that parents with low literacy are less capable of understanding food labels, identifying appropriate portion sizes, and preparing infant formula properly.

Race also plays an important role in access to the health care system by adolescents. Elster and colleagues (2003) conducted a review of studies that identified the level of racial and ethnic disparities in primary care, mental health care, reproductive health care, and asthma care of teenagers independent of their socioeconomic status. A

total of 31 studies were included that covered analyses of children and adolescents ages 17 years and younger. Three studies stated that African American adolescents received fewer mental health care services than white adolescents. For reproductive health care services, one study found that African American teenagers ages 15-19 years of age were significantly more likely to talk about reproductive health issues with their provider and to get tested for a sexually transmitted disease. For asthma care, African American adolescents were less likely to receive preventive medication when compared to white teenagers. The authors concluded that racial and ethnic disparities in health care for adolescent are a continuing problem.

In conclusion, parents with limited education display lower health literacy. This is accentuated by being of minority descent and having low socioeconomic status. Such individuals have poorer knowledge of the health care system and limited nutrition knowledge, which impacts the health of their children in a negative way. Studies have also found that in adolescents, racial and ethnic disparities in health care are a continuing problem that needs creative interventions to help assure better health outcomes for adolescent mothers and their children. Additionally, these data have implications when planning a nutrition intervention program for teenage mothers. Nutrition education materials targeting improvement in nutrition knowledge, cooking knowledge, self-efficacy towards cooking and healthy eating, and dietary intake must include the target audience in the development and testing of program materials.

Social Cognitive Theory of Behavior Change

In today's society, more emphasis is being placed on targeting behavior change in order to improve health. Such change could be obtained through the process of health education, defined as "any combination of learning experiences designed to facilitate voluntary adaptations of behavior conducive to health" (Green et al., 1980). One model of interpersonal health behavior that can be applied to teenagers is the Social Cognitive Theory (SCT). According to Bandura (1997), human behavior can be seen as an interaction between three aspects: behavior, personal factors, and environmental influences. These three factors interact and influence each other in order to promote health behavior. Reciprocal determinism states that if one component changes, a transformation will occur in another. Another component of SCT is self-efficacy, which is represented by the confidence a person feels about carrying out a particular action. This also includes overcoming the barriers that can arise while performing that action. Bandura believes that this component is an important precondition for behavior change because it influences the amount of effort devoted to a given task and what level of performance is achieved. A third concept is behavioral capability, which states that in order to have an individual carry out a specific behavior, the individual must identify the behavior and how to execute it. The concept of reinforcement, particularly positive reinforcement, states that a reward should be offered to an individual for performing a certain behavior in order to increase the chance of repetition of that behavior (Glanz et al., 2002).

Several studies have examined the relationship between the constructs of the SCT and diets of teenagers. Malison and colleagues (2005) used the SCT to examine environmental, personal, and behavioral factors that influence selection of fruits and vegetables among 10- to 13- year old low-income black American adolescents, who were recruited from the National Youth Sports Program (NYSP). The NYSP provides learning activities that highlight substance abuse prevention, career planning and education, nutrition, and an active lifestyle. Participants were divided into six focus groups, 5-7 participants each. The questions used for the focus groups were based on the constructs from SCT. These adolescents were asked about family and social support, fruit and vegetable accessibility, self-efficacy, and ability to prepare meals and snacks. For self-efficacy, adolescents responded that they could eat fruits and vegetables in a variety of situations. Both genders showed a high level of self-efficacy in terms of consuming fruits and vegetables. These teenagers also stated that their self-efficacy in the presence of their peers was high. For behavioral capability, the majority of students indicated they helped with the preparation of meals and snacks. Females were more likely to perform activities such as chopping, cutting vegetables, and cooking simple dishes, while the males were not involved in cooking or just performed very simple food preparation. Lack of accessibility of fruits and vegetables was mentioned as one environmental factor that was influencing their consumption by the adolescents. The teenagers stated three locations as common places to eat fruits and vegetables, including the homes of other family members, restaurants, and school. Participants stated that even though their family was offering support in terms of consuming fruits and vegetables, their peers were

less likely to encourage such practices since they tended to eat more “junk”. The authors concluded that their study was able to identify essential and distinctive features of personal, environmental, and behavioral factors that are related to the fruit and vegetable consumption by low-income black American teenagers.

The Social Cognitive Theory (SCT) has been used as a health model by a number of researchers to explain how environmental, personal, and behavioral components influence dietary intake. This theory can be a useful tool to predict how these factors influence the dietary intake of teenage mothers.

Studies have shown that teenage mothers have lower self-esteem and social support than adult mothers. McVeigh and Smith (2000) compared a group of teenage and adult mothers and found that at six months postpartum, the adult mother displayed higher self-esteem than the teenagers. Social support from mothers and partners decreased significantly for both the adult mothers and the teenagers at 6 months. Quinlivan and colleagues (2004) also looked at the level of social support in teenage mothers and found that they significantly misjudge the amount of support they receive in the antenatal period compared to 6 months postpartum.

Many authors have found positive associations between social support and performance of healthy behaviors. Mahon, Yarcheski, and Yarcheski (2004) reported a strong correlation between social support and positive health practices such as safety, exercise, relaxation, substance use avoidance, nutrition, and health promotion. Similar results were reported by other authors in terms of social support and healthy behaviors

(Mahat and Scoloveno, 2001; Yarcheski, Mahon, and Yarcheski, 2003). Thus, low social support can be related to unhealthy behavior in teenagers.

Teenagers who lack social support have low self-efficacy and this in turn leads to the performance of unhealthy behaviors. Sterling and colleagues (2007) found that self-efficacy had an indirect effect on smoking intention in a group of high school students from Texas who were smokers. Fagan and colleagues (2003) also looked at smoking behavior in adolescents employed in grocery stores in Massachusetts and found that individuals who smoked more frequently had lower self-esteem. They also reported that if friends encouraged the smokers to quit, self-efficacy to stop smoking was higher. In these cases, adolescents with low self-efficacy are more likely to perform unhealthy behaviors.

Low-self efficacy can lead to poor nutritional habits. A study by O’Dea and Wilson (2006) found that nutrition knowledge and self-efficacy were positively correlated with BMI in adolescents. Diane Von and colleagues (2004) reported that self-efficacy was positively associated with physical activity and healthy nutrition behaviors in college students. Winkler and Turrell (2009) discovered in a study that if people were confident about preparing vegetables, they were also more likely to buy a greater variety of these food products.

Previous studies have shown that nutrition education and cooking classes have a positive impact on the nutrition and cooking knowledge of teenage mothers. Owen, Kendal, and Wilken (1997) conducted four-one hour classes designed to improve the nutrition knowledge and the skills to plan nutritious meals of 39 pregnant and postpartum

adolescents, and they successfully increased nutrition knowledge and skills behavior of the program participants. When Long, Martin, and Jason-Sand (2002) applied the Great Beginnings Program, a 6-lesson nutrition program, to a group of teenage mothers, they were able to increase their nutrition knowledge. All of these changes can lead to an improved dietary intake in pregnant and parenting adolescents.

Other studies conducted using samples of teenagers who gained nutrition knowledge show that such adolescents are more likely to perform healthy behavior. Abood, Black, and Coster (2008) evaluated the effect of a school-based nutrition education minimal intervention using a sample of 551 teenagers in the intervention group and 329 in the delayed treatment group, and discovered that the teenagers in the intervention group were “somewhat likely” to consume fewer fried foods, eat fewer sweets, and examine food labels more often.

Some studies have used the Behavioral Capabilities and Reinforcement concepts of SCT to change unhealthy behaviors to healthy ones. Turner-McGrievy and Campbell (2009) conducted a pilot intervention study to increase the knowledge of public librarians on the topic of saturated fat and to find resources to reduce fat consumption. The Behavioral Capability aspect of this program included teaching the librarians on how to find resources related to saturated fat. At the end of the course, the participants had significantly increased their knowledge on the topic and 39% of the participants had helped some of their patrons find information on topics associated with saturated fat. Ha and Caine-Bish (2009) investigated the implementation of a general nutrition class designed to improve fruit and vegetable consumption in 80 college students ages 18 to

24. The authors used the Behavioral Capabilities concept to have the students select fiber-rich/ low-fat foods from a menu, to bring to class their favorite recipes which were high in calcium, and to assess their own risk of osteoporosis and cardiovascular disease. The concept of Reinforcements was also used when the students were asked to try new food dishes containing vegetables and to submit a written report on their experience. Participants were successful at significantly increasing the intake of fruits and vegetables and intake of fresh fruits and vegetables.

In summary, the Social Cognitive Theory model can be applied to adolescent and young adult mothers. Using this model, interventions could be designed to improve dietary habits and cooking skills, and promote healthy behaviors in this population.

Nutrition education benefits for adolescent mothers/pregnant adolescents

A number of interventions have been conducted to improve the dietary intake of adolescent mothers and pregnant teenagers. Hunt and colleagues (2002) investigated whether nutrition education is beneficial for gaining proper weight during pregnancy and for positive pregnancy outcomes (fewer premature births and fewer low-birth weight infants) in a sample of US adolescents. Participants included 32 pregnant adolescents, ages 14 to 19 years, from the Oklahoma Expanded Food and Nutrition Education Program (EFNEP) and the Chickasaw Nation Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). These adolescents participated in two nutrition education programs, Eating Right is Basic (ERIB), an educational program for adults (n=14), and “Have a Healthy Baby” (HAHB), a program developed for pregnant adolescents ages 11 to 19 years (n= 18). Data were collected during three time intervals:

at baseline, at 8-weeks following the administration of each program, and at least one month after the birth of the baby. The authors found no significant difference between the two programs in terms of prenatal weight gain. However, both groups showed a significant decrease in BMI between pre and post nutrition education and also between post nutrition education and post-delivery. The duration of hospital stay for teenagers in the HAHB group was significantly lower than the ERIB group. The authors concluded that nutrition education has beneficial effects on pregnancy outcome in adolescents.

Owen, Kendall, and Wilken (1997) developed and pilot tested a four week nutrition workshop planned for 39 pregnant and parenting adolescents. These classes were part of the Teen Parent for Healthy Children project and some of the aims included increased nutrition knowledge of pregnant and postpartum women, infants, and children; increased skill in planning nutritious meals and snacks; buying healthy foods; reading food labels; and improved dietary behavior and intake. The lessons for this intervention were chosen from the University of New Hampshire Cooperative Extension's Great Beginnings Curriculum and were modified to meet the targeted curriculum. The Great Beginnings program, developed by the University of New Hampshire Cooperative Extension, is a 6-lesson nutrition program that highlights the important nutrition issues of pregnant teenagers. To assess the efficacy of the program, participants were administered pre- and post-knowledge questionnaires, skill/behavior checklists, and 24-hour food recalls. Classes were held at a WIC clinic in Arvada, Colorado, and at three public high schools. A control group of 10 pregnant and parenting adolescents took all of the tests but did not participate in the class series. The workshop was comprised of four one-hour

classes which extended over a four-week period of time. A significant improvement in nutrition knowledge scores was observed in the intervention group, from 59% at pre-test to 89% for the post-test. No changes in this score were seen with the control group. Also in the intervention group, 87% of participants reported making a positive skill/behavior change in at least one of the eight nutrition and food resource management practices assessed. There was a significant difference between the two groups in terms of positive skills/behavior changes. The control group mean was 1.4 positive skills/behavior vs. 2.5 for the intervention group. Neither the control nor the intervention group showed a change in pre- and post 24-hour recalls. The authors concluded that this workshop was useful in improving the nutrition knowledge of the adolescents but might not be sufficient to elicit behavior change since no differences were seen with the 24-hour recalls.

Long, Martin, and Janson-Sand (2002) were interested in the effect of the Great Beginnings program on the nutrition knowledge, diet quality, and birth outcomes of pregnant and parenting adolescents. The intervention group of 136 teenagers was enrolled in the Special Supplementation Nutrition Program for Women, Infants, and Children (WIC), and was compared to 3 control groups. The first control group (C-1) of 63 pregnant adolescents was enrolled in WIC but did not receive the Great Beginnings curriculum. The second control group (C-2) had 50 nonpregnant high school participants who received the Great Beginnings lessons as part of a high school Family and Consumer Science class. The last control group (C-3) contained 50 nonpregnant high school students who were not exposed to the Great Beginnings curriculum. All participants took an entry and an exit knowledge exam consisting of 40 multiple-choice questions based on

the objectives of the Great Beginnings curriculum. Also, 24-hour recalls were administered. The exam and the recall were done at the beginning of the study and also 6 weeks later. The intervention group had a higher nutrition knowledge score compared to the 3 control groups. Based on the two 24 hour recalls, the intervention group met the intake levels of 17 nutrients recommended for a healthy pregnancy. For the C-1 group, the 24-hour recall post-test values for all 17 nutrients declined with intakes of energy and protein reported as significantly below recommended values for this group. Also, the intervention group had a lower low-birth weight rate compared to the C-1 group. The authors concluded that the teenagers who received the Great Beginnings curriculum attained healthier birth outcomes in comparison to the teenagers not exposed to the program.

The studies presented above show that in the case of pregnant teenagers, nutrition education is associated with positive pregnancy outcomes such as decreased low birth weight babies and fewer days spent in the hospital by the teen mothers. Parenting adolescents showed improved nutrition knowledge following participation in these interventions. Agencies serving pregnant and adolescent mothers should provide nutrition education, since beneficial changes in their nutrition knowledge and dietary behavior have been reported.

Nutrition education benefits for low-income pregnant or parenting adult mothers

Nutrition education is not only beneficial to pregnant or parenting adolescents, but also to low-income pregnant and parenting adult women. Widga and Lewis (1999) developed an in-home, prenatal nutrition intervention protocol designed for low-income

pregnant women. The main goal was to improve the dietary intake of these women by conducting sessions that focused on nutrition assessment, education, counseling, and goal setting. The protocol included 40 low-income pregnant women, along with 26 controls. Women in the intervention group took part in four weekly sessions, which were followed by two monthly visits. The authors found that the pregnant women in the intervention group were able to significantly increase their energy, folate, vitamin B6, iron, zinc, and calcium intake. These women also significantly increased their consumption of vegetables and grains/breads per day. Briley, Flanagan, and Lewis (2002) evaluated the effect of an in-home nutrition intervention with 20 low-income pregnant African American women (10 in intervention group, 10 in control group). The intervention was adapted from the one created by Widga and Lewis (1999) that is mentioned above, and could include up to 10 classes: the first 6 classes included diverse nutrition topics, and classes 7-10 could be used to reinforce messages from previous classes. The intervention group was able to significantly increase their iron intake, along with delivering infants that had a higher birthweight.

Klohe-Lehman and colleagues (2006) conducted a series of eight weekly weight-loss classes with 141 low-income mothers. The classes focused on dietary, activity, and behavior changes. At the end of the classes, mothers significantly improved their knowledge in the areas of prenatal nutrition, child nutrition, vitamins and minerals, macronutrients, weight loss, and Food Guide Pyramid. Also, mothers that were associated with greater nutrition knowledge were more successful at losing weight.

These studies show that nutrition education is beneficial for low-income pregnant or parenting adult women. Nutrition education should be presented to both pregnant and parenting mothers because it improves the health of the mother and it also has an effect on the infant, such as increased birthweight.

Improvements in the dietary habits of mothers have a positive impact on the dietary habits of their children

Parents can significantly influence food consumption and food acceptance in their young children (Papas et al., 2009; Ioannotti, O'Brien, and Spillman, 1994; Drucker et al., 1999; Francis, Hofer, and Birch, 2001; Fox et al., 2006). Due to the rising obesity epidemic in the US, a number of studies have investigated the prevention of childhood obesity by using the parents as agents of change. Klohe-Lehman and colleagues (2007) investigated the effects of a weight loss intervention for mothers and their 1-3 year old children. A total of 91 mothers, ages 18-45 years old, and their children, participated in the study. The participants were 62.6% Hispanic, 22.0% African American, and 15.4% white. The program consisted of eight weekly classes that lasted around two hours each. Each class consisted of 15 minutes of weigh-in, 1 ¼ hours of discussion and activities, and 30 minutes of low- to moderate-intensity exercise. At the end of the eight week program, mothers had lost a mean of 2.7 kg, and they reduced their BMI from 34.9 kg/m² to 33.9 kg/m². At baseline, the children's energy intake was above the Estimated Energy Requirements, which then significantly decreased at week eight. Consumption of breads, fruits/fruit juices, meats, snacks/desserts, and sweetened beverages also decreased. Both mothers and children were less likely to consume foods from fast food environments but

more likely to cook meals at home. The authors suggest that mothers can be used as agents of change to positively improve the dietary intake of their young children.

Epstein and colleagues (2001) investigated the effect of a behavioral intervention in families at risk of childhood obesity. The 27 families who participated in the study each contained at least one obese parent and a six to ten year old, non-obese child. The families were randomly assigned to a group whose target behavior was to increase fruits and vegetable intake or a group to decrease high fat/high sugar food consumption. Weight control treatment was offered to the parents for eight weekly meetings, followed by four biweekly and two monthly meetings for a total duration of six months of treatment. The Increase Fruit and Vegetable group significantly increased their consumption of fruits and vegetables compared to the other group. Similarly, the Decreased Fat and Sugar group significantly decreased their intake of high fat/high sugar products. Children showed a trend of increasing fruit and vegetable intake but both groups significantly increased their consumption of high fat/high sugar foods. The authors concluded that it would be best to design interventions that target increased consumption of fruits and vegetables for families instead of reducing the intake of low nutrient dense foods.

Harvey-Berino and Rourke (2003) conducted a pilot intervention study that compared an obesity prevention with parenting support (OPPS) program versus a parenting support (PS)-only program in Native-American children who are at high risk of obesity. Forty mother-child pairs participated and were randomly assigned to the PS or OPPS group. The participants underwent a 16-week program delivered by peer educators

in the home of the participants. The PS group received lessons designed to improve the child's psychological and behavioral goals. The OPPS group received the same lessons along with strategies to develop proper eating and exercising behaviors in children. A trend of decreased energy intake for OPPS children versus an increase in the energy intake of the children in the PS group was detected. The authors suggest that this type of intervention can help prevent childhood obesity.

In conclusion, parents prove to be positive agents when used to change the dietary intake of their children. Studies have shown that improvement in the dietary habits of parents leads to a positive change in the eating habits of their children, such as reduced energy intake, and reduced consumption of low nutrient foods. Also, these studies have shown a positive trend towards consumption of fruits and vegetables. More studies need to be conducted to determine the beneficial effects parents can have on changing the dietary habits of their children.

Community-based participatory research

Community-based participatory research (CBPR), which includes community agencies and researchers, results in successful research projects (Minkler & Wallerstein, p 48). The main goal of such research is to become integrated in the community, to learn the beliefs and perceived needs of that community, and to advance the health and welfare of the community members. Nine principles represent the most important aspects of this type of research. First, the community is seen as a unit of identity and it may be defined by the geographical location or values and beliefs the individuals held while living in such a location. Second, CBPR is based on the strengths and assets found in the

community such as resources and relationships between the different members living in the community that can point to common health concerns. Third, this type of research emphasizes having joint and fair collaborations and also promotes power-sharing processes to aid to social inequality. All of the partners can be part of all of the different aspects of the research project, such as problem definition, collection of data, analysis of results, and dissemination of findings. Fourth, CBPR supports co-learning among all collaborators. Fifth, CBPR must accomplish an equilibrium between conducting research and taking actions that will benefit all of the partners. The main goal is to discover as much information about the health of the community as possible while at the same time combining this knowledge with different actions that will help improve community health. Sixth, CBPR accentuates health issues of local significance and places emphasis on an ecological model of health and disease. This ecological model includes the person, the environment in which he/she lives (immediate context), and the community and society this individual is part of (larger context). Seventh, CBPR is based on a system that develops a partnership which includes a cyclical and repetitive process with respect to all stages of research, such as community assessment, problem definition, and data collection and analysis. Eighth, CBPR disseminates the results and the knowledge acquired during the research to all of the collaborators and engages all of the partners in this process. Finally, CBPR is a lasting process and requires a pledge for sustainability. In order to have a successful project, the collaborations between the different partners need to span a longer period of time, and not be limited to the funding period of the research, a frequent limitation in establishing or continuing collaborations.

A good example of a successful CBPR project is the one conducted by Casell and colleagues (2005). The authors examined a CBPR project, Community Coalition Partnership Programs for the Prevention of Teen Pregnancy (CCPP). This seven-year program (1995-2002), was funded by the Center for Disease Control and Prevention (CDC) Division of Reproductive Health, and involved 13 U.S Cities. The main aim was to have different community partners use different community resources to create sustainable and successful programs that could prevent initial and successive pregnancies in adolescents. The CCPP program was implemented in two phases. Phase I (planning and preparation) started in 1995. This stage was conducted under a program logic model which focused on issues that influence the occurrence of short-term adolescent pregnancies, avoidance effects, intermediary outcomes, and program impact. In Phase II (implementation) of the project, more tools were included to help the communities apply and assess their efforts to implement this program. During Phase I, community coalitions, which included between 7-70 members, were created at each of the sites. Next a needs and assets evaluation of the communities was completed. Last, community action plans (CAP) were developed that presented the activities for the next five years and included community intervention policies, and an evaluation plan. Phase II of the project started in October 1997. At this stage, the community coalitions made the communities more aware of the frequency and effects of teenage pregnancies. Partnerships with other community agencies and public institutions were created to implement the adolescent teen prevention program. These partners were also taught how to apply for grants in order to enlarge their pregnancy prevention programs or to even

develop new programs in the same area. The CDC supervised some parts of the data collection in order to keep track of the program implementation and evaluation. CDC worked with the University of South Carolina's Prevention Research Center (PRC) to evaluate the lessons learned in the CCPP's mobilization efforts. They also worked with the University of Alabama at Birmingham's Prevention Research Center to analyze the outcomes during Phase II of the project. A third phase was added during the last year of the project to allow the communities to conclude their projects and to plan publications to disseminate the results of their work at the national, regional, and community level. While no results were presented in this article, the CDC anticipates that the lessons learned from this project will help them develop other community-based participatory research projects, which could involve a larger number of community partners, to help implement successful adolescent pregnancy prevention policies.

Primary Investigator Experience

Preliminary results from Nutrition Education (NTR) 607 class, spring 2008

The first work conducted with the Teen Parent Mentor Program (TPMP) at YWCA, the community partner for this work, took place during the NTR 607 (Nutrition Education) class in spring 2008 under the guidance of Dr. Margaret Savoca. For this class, four groups of students, 3 to 4 students in every team, conducted different activities to help improve the living conditions of adolescent mothers enrolled in the TPMP program. One of these groups conducted a set of three cooking classes. The graduate students planned menus that included foods that adolescents eat on a normal basis, foods they know how to cook, and foods that should be consumed on a regular basis, such as

vegetables. Each lesson included different recipes and teaching objectives that emphasized kitchen/skill safety, nutrition and menu planning.

The cooking classes took place at the College Park Baptist Church kitchen, Greensboro, NC, in their Fellowship Center which has a small kitchen area. Each class lasted approximately two hours. The teenage mothers were divided into teams among the four graduate students (3 teen mothers per team). Following the preparation of the food, the teens served dinner buffet style to all of the adolescents and the graduate students.

During the last night together, the teens were asked for feedback regarding the classes. The adolescent mothers disliked the drink choices that were offered (water, Crystal Light lemonade, and fruit punch) and instead preferred to drink sodas and sweeter drinks. They also requested better tasting vegetable selections and no mixed dishes. Another request was to have longer classes to learn more skills or better develop the ones they had just acquired. The graduate students also identified the problem of not having enough time to conduct these classes. Recipes were picked based on this issue and the need to prepare larger amounts of each recipe to feed all participants. Overall, the classes were liked and enjoyed by the teenage mothers. Funding for these cooking classes was provided by the Office of Leadership and Service Learning at UNCG.

Preliminary results from NTR 601 class, spring 2009

Another set of cooking classes was conducted during spring 2009, under the guidance of Dr. Margaret Savoca, by two graduate and two undergraduate nutrition students. Adolescent mothers were again recruited from the YWCA Teen Parent

Mentoring Program, who signed up on a volunteer basis for the project. Twelve mothers participated in the classes.

Menu planning was based on suggestions from the mothers. Following completion of the first cooking class, the teenagers were asked to write down the top three foods they would like to learn to cook. Recipes were obtained from the “Better Homes and Gardens Anyone Can Cook” cookbook.

In total, four cooking classes were held. Each class lasted approximately two hours, which began with a 15 minute education session. Following the educational session, the mothers were split into groups and each group went with a nutrition student to cook the recipe assigned for that group.

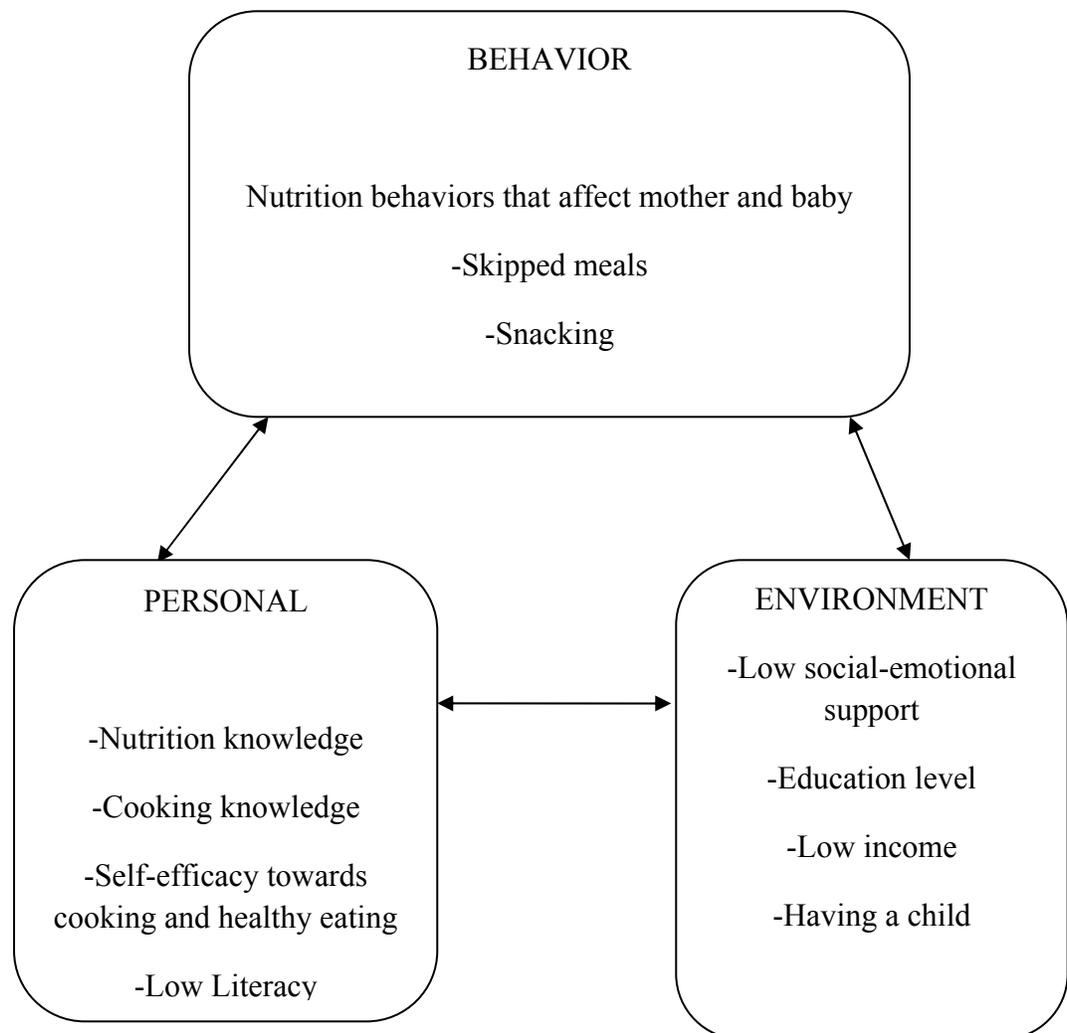
During the last dinner together, the mothers were presented with a copy of the cookbook “Better Homes and Gardens Anyone Can Cook”, along with a liquid measuring cup, a spatula, a certificate for participation in the classes, and a notebook containing relevant nutrition information presented during the classes. Funding for these classes was provided through a private donation made to Dr. Debra Wallace in the School of Nursing.

Theoretical Basis for the Project

Social cognitive theory (SCT) can be used to explain the current nutrition behaviors of adolescent and young adult mothers. These mothers are at risk of performing unhealthy behaviors because of decreased social-emotional support, low education, low income, and the presence of a baby in their lives. Not having a strong background in nutrition knowledge and cooking skills, combined with a general low self-

efficacy and low literacy can also lead to the performance of unhealthy behaviors by adolescent and young adult mothers. Additionally, these mothers might not perceive their eating environment as a system in which foods have to be affordable, acceptable, and available due to a lack of nutrition knowledge and other barriers. When these mothers lack social-emotional support, their self-efficacy may be low and they might not be interested in nutrition knowledge and cooking skills.

Figure 1-Social Cognitive Theory explaining current situation of adolescent and young adult mothers



The Social Cognitive Theory can be used as a model to explain the current situation in which the adolescent and young adult mothers find themselves, as the one presented above. By improving nutrition knowledge, cooking skills, and self-efficacy toward healthy eating and cooking, these mothers can make healthy changes to improve their dietary behavior. Findings from the cooking classes that resulted from a collaboration between UNCG and YWCA of Greensboro showed that this population is very enthusiastic about learning such new skills or expanding the ones they already have.

Public health educators develop logic models for planning interventions to be conducted in the community (<http://www.cdc.gov/eval/resources/index.htm>). An example of such a logic model that could be used for planning nutrition education for the population of adolescent and young adult mothers from the YWCA is presented on page 40. Under the Input section, the staff who will be part of such a program will have to invest time into running the program and creating materials for classes, along with investing money to buy groceries and other incentives. Under the Output section, the staff will be able to teach nutrition education classes and cooking sessions to the adolescent and young adult mothers, and offer opportunities to these mothers to socialize and practice meal planning. Under the Outcome section, some short term goals could be to increase the cooking knowledge, nutrition knowledge, and self-efficacy towards cooking and eating healthy for the participating mothers. Some long term outcomes could include a change in the diet of the mothers and their children, along with changes in the way they prepare their meals.

Table 1. Program Nutrition Education and Cooking Classes Logic Model
 Situation:

Inputs	Outputs		Outcomes -- Impact	
	Activities	Participation	Short	Long
What we invest: <ul style="list-style-type: none"> • Staff- graduate and undergraduate students, YWCA staff, UNCG professors • Time- to run the classes, to create handouts, to cook recipes to interview participants, to write-up recipes • Money- to buy food, incentives • Materials- handouts, cookbooks • Equipment- cooking equipment • Partners- YWCA of Greensboro 	What we do: <ul style="list-style-type: none"> • Teach nutrition knowledge • Teach meal planning knowledge • Offer opportunities to practice cooking • Offer opportunities to practice meal planning • Teach cooking classes • Provide feedback on cooking skill • Offer opportunity for socialization 	What we reach: <ul style="list-style-type: none"> • Participants: adolescent and young adult mothers 	What short term results are: <p>Learning</p> <ul style="list-style-type: none"> • Increase in the nutrition knowledge • Increase in the cooking knowledge • Increase in self-efficacy towards cooking and eating healthy • Increase in meal planning/ shopping for healthy foods • Change in attitudes toward cooking and eating healthy 	What long term results are: <p>Conditions</p> <ul style="list-style-type: none"> • Observe a change in the diet of teenage mothers • Observe a change in the diet of the children • Observe a change in meal preparations

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YWCA flier. Program Highlights Teen Parent Mentor Program

CHAPTER III
HEALTHY EATING KNOWLEDGE AND BELIEFS, COOKING/SHOPPING
PRACTICES, AND FOOD CHOICES OF ADOLESCENT AND YOUNG ADULT
MOTHERS ENROLLED AT THE YWCA OF GREENSBORO

This chapter is an article that will be submitted to the journal Family & Community Health.

Abstract

This study describes formative research to identify factors that affect the knowledge and attitudes toward healthy eating, cooking/shopping practices, and food choices of adolescent and young adult mothers enrolled in life-skills programs at the YWCA of Greensboro. A CBPR approach was used to partner with the YWCA and interview ten adolescent (15-19 years) and 10 young adult mothers (20-30 years). Definitions for “healthy” vs. “unhealthy” eating practices were simplistic and similar between groups. Results indicated that tight food budgets and transportation issues were impediments for eating healthy and cooking/shopping practices. Most participants ate lunch and dinner; only half ate breakfast. Life-skills programs for young mothers should include nutrition education and cooking skills components to help improve dietary behaviors.

Key words:

Young adult mothers

Meal patterns

Adolescent mothers

Healthy eating

Introduction

Some single limited-income pregnant and parenting women and their children are at risk for inadequate nutritional intake and other health consequences during and after pregnancy (Moran, 2007; Giddens et al., 2000; Pobocik et al., 2003; Haire-Joshu et al., 2011). Due to high stress, a number of pregnant women may be more likely to consume energy dense and nutrient poor foods, resulting in poor diet quality (Hurley et al., 2005). Nutrition inadequacy has been also reported among pregnant teenagers, who were consuming below the Dietary Reference Intakes (DRI) for calcium, iron, vitamin E and many other micronutrients (Moran, 2007; Giddens et al., 2000; Pobocik et al., 2003). Low-income women are likely to be limited in their ability to buy and eat healthy foods during pregnancy, which can result in delivery of low-birth weight infants (Fowles et al., 2011). Even after the baby's birth, low-income adolescent mothers may put themselves at risk for nutritional inadequacy by not consuming breakfast on a regular basis (Haire-Joshu et al., 2011).

Adequate nutrition intake is important for mothers and their children. Parental nutrition knowledge and eating habits influence the home environment for children's food availability and consumption (Benton, 2004; Birch and Davison, 2001; Wardle, Carnell, and Cooke, 2005). Parenting style influences a child's food preference development (Benton, 2004), as do parents' own eating behaviors and child-feeding practices (Birch and Davison, 2001). Parents who are overweight, who have difficulties controlling their own food consumption, or who are worried about their child's risk of rapid weight gain may implement controlling child-feeding practices in an effort to

prevent their child from becoming overweight (Birch and Davison, 2001). Education efforts that target parental nutrition knowledge and dietary intake could improve child-feeding practices overall.

Community-based participatory research (CBPR), which includes community agencies and researchers, results in successful research projects (Minkler & Wallerstein, p 48). The main goal of such research is to become integrated in the community, to learn the beliefs and perceived needs of that community, and to advance the health and welfare of the community members. Interventions using CBPR can be developed to target health needs of specific groups and the community as a whole (Davis, Goldmon, & Coker-Appiah, 2011). A key component of CBPR is formative research to help researchers understand the factors which contribute to health disparities in particular communities (Bogart and Uyeda, 2009; Kong et al., 2012). The Young Women's Christian Association (YWCA) in Greensboro, North Carolina offers a number of life-skills programs designed for adolescent and young adult mothers (www.ywca.org). Given the high-risk of poor dietary habits of young pregnant and parenting mothers and the goals of the YWCA to improve the lives of those mothers, the YWCA may be an appropriate venue to conduct nutrition education as part of health interventions because a) it is recognized by other agencies and people living in the community as an important organization serving young at-risk mothers, b) it has a successful history of providing beneficial programs that improve pregnancy outcomes for the targeted young mothers, and c) it successfully maintains its enrollment of adolescent and young adult mothers who want to improve their lives.

The YWCA: a promising setting for community-based health interventions

The Young Women's Christian Association (YWCA) has addressed the needs of women around the US since it was first established in 1858 (www.ywca.org). Annually, the YWCA serves over 2 million women, girls, and their families (www.ywca.org). The YWCA in Greensboro, North Carolina, provides a variety of programs for adolescent and young adult mothers such as Teen Parent Mentoring Program (TPMP), Healthy Moms Healthy Babies (HMHB), and Teens Learning Childbirth. Evidence suggests several health benefits associated with participation in YWCA programming. The Greensboro YWCA serves over 200 pregnant and adolescent mothers annually. Fewer than 2% have repeat births each year compared to a 25-30% repeat birth rate in Guilford County (C. Dobson, personal communication, March 16, 2012). Also, YWCA participants, who mostly African American or Hispanic had only 4.2% low birth weight births to teens in the past 4 years compared to about 12.2% of births to minority teens in Guilford County. The program specifically designed for adolescent mothers is the Teen Parent Mentoring Program (TPMP). This program is a relationship-based, long-term comprehensive program that aims to support teen moms (13-19 years) in their roles as parents, students, and young women (www.ywca.org).

The Greensboro YWCA also serves close to 200 young adult mothers each year, through the Healthy Moms Healthy Babies (HMHB) program. In this population, which also consists mostly of African American or Hispanic women, only 7.3% of pregnancies resulted in low birth weight infants over the past 4 years compared to 11.9% of minority adults ages 20-29 in Guilford County (C. Dobson, personal communication, March 16,

2012). Eighty-four percent of participants reported having breastfed their babies compared to 45% of African American mothers in the southeastern US. The HMHB program, for single women 20-30 years old and their children, is designed to help young women have healthy pregnancies, healthy children, and maintain a healthy lifestyle between pregnancies. Both the TPMP and HMHB programs are held every other Tuesday night at the YWCA. The mothers meet as a group and take part in different activities such as learning about violent and abusive relationships, participating in exercise, or learning how to avoid STDs.

The YWCA in Greensboro, North Carolina is committed to improving the lives of adolescent and young adult mothers through a variety of programs developed to address their varied needs (www.ywca.org). The YWCA collaborates with numerous community partners to make these programs successful. A CBPR approach was used to partner with the YWCA of Greensboro to identify personal, environmental, and behavioral factors that influence the food choices of adolescent and young adult mothers enrolled in their life-skill programs. Such information can be used to develop a nutrition education program for these mothers within the ongoing YWCA programs. The purpose of this paper is to compare and contrast the knowledge and attitudes toward healthy eating, cooking/shopping practices, and food choices of adolescent and young adult mothers enrolled in life skills programs at the YWCA of Greensboro in order to develop relevant nutrition education interventions for the target audience.

Methods

Background on the partnership with the YWCA

The collaboration between the student researcher (Ioana Scripa) and the YWCA of Greensboro started in spring 2008 under the guidance of Dr. Margaret Savoca. Four groups of 3-4 nutrition students conducted different activities to help improve the living conditions of adolescent mothers enrolled in the TPMP program.

During spring 2009, under the guidance of Dr. Margaret Savoca, the student researcher was involved in a series of four cooking classes between the UNCG Department of Nutrition and the YWCA of Greensboro. Twelve adolescent (TPMP) mothers volunteered to participate in the classes which were held at a local church (Church of the Covenant) which had a separate kitchen for food preparation and an activities room where meals were served and eaten. Each class lasted approximately two hours. Following the educational session, which lasted no more than 15 minutes, the mothers were split into groups and each group worked with a nutrition student to cook the recipe assigned for that group.

For further development of the partnership, and in order to familiarize potential participants with the student researcher, the YWCA staff invited the student researcher to attend programming nights for both groups of women and several outings organized for the participants. The student researcher was present for a number of programming nights and went to a swim outing at a local pool in Greensboro, NC, with some mothers enrolled in the TPMP program during spring and summer of 2010.

Participant recruitment

Based on our CBPR partnership, the YWCA staff helped the student researcher recruit project participants. Since the YWCA target population is adolescent and young adult mothers, a convenience sample of mothers from both the TPMP and the HMHB programs was recruited. The student researcher attended a session for each program and presented details about the project, the role of participants, and benefits of participating. The YWCA staff encouraged mothers to enroll in the study. Those over 18 years of age completed consent forms, and assent was obtained from participants under 18 years along with parental consent. Interviews were conducted at the YWCA facility or at the participant's home. The Institutional Review Board of the University of North Carolina at Greensboro approved the study protocol.

Data collection

Using a formative research approach, mothers were interviewed individually. A semi-structured interview was done to obtain information from the mothers regarding their cooking and shopping practices, nutrition knowledge, and food choices. Each interview lasted about one hour, was audio-recorded and transcribed by a research assistant, and transcripts were reviewed for accuracy by a second researcher. At the end of the interview, each mothers received a gift bag containing a variety of kitchen utensils (e.g., measuring spoons, measuring cups, liquid measuring cups, kitchen towels).

The interview guide was created based on the conceptual framework of the Social Cognitive Theory (Bandura, 1977; Green et al., 1980, Corwin et al., 1999; Cullen et al., 2001; Neumark-Sztainer et al., 2003; Lytle et al., 2003). The interview included

descriptive information such as age, education level, work status, housing conditions, age of child, and enrollment in the government assistance programs, Special Supplemental Food Program Women, Infants, and Children (WIC) and Supplemental Nutrition Assistance Program (SNAP). Mothers were also asked about shopping practices (transportation, types of stores, and use of coupons), and to define healthy eating practices and describe their importance. Finally, participants were asked to describe their cooking practices and issues related to meal preparation. Following completion of the interview, all participants completed a Meal Pattern Timeline (MPT) questionnaire, using a structured interview which guides individuals through a depiction of their weekday activities, meal patterns, and food choices (Savoca et al. 2011). An experienced researcher (Dr. Margaret Savoca) listened to three practice interviews that were audiorecorded and instructed the student researcher (Ioana Scripa) on how to phrase the questions to get the most complete information from the participants.

Data analysis

Means were computed for age, household size, and age of child using JMP Statistical Software (version 8.0, SAS Institute, Cary, NC). Frequencies were tabulated for living conditions, school status, work status, child gender, WIC, and SNAP benefits. Next, the interviews were reviewed and each statement made by a participant was assigned a code using Atlas.ti. 6 software (www.atlasti.com). A total of 31 codes were issued for the interviews. These codes were developed by the student researcher with help from Dr. Savoca. These broad codes were then transformed into more refined ones. Next, these codes were grouped into subthemes and themes. Three major themes

developed from the interviews. For each major theme, appropriate quotations were also identified. All of themes were compared and contrasted within and between the two groups of participants.

The MPT was analyzed by constructing matrices with meal pattern variables as columns and rows corresponding to the two groups of participants. Foods that were eaten repeatedly by each of the groups were summarized. Summary profiles were created from the matrices depicting the daily activities, meal patterns, and food choices of each group of mothers (Savoca et al., 2011).

Results

Participant characteristics

Twenty participants, including 10 adolescent (TPMP) mothers and 10 young adult (HMHB) mothers, completed interviews between June and October 2010, representing a majority of mothers from each program at the YWCA as 10-15 HMHB and 15-20 TPMP mothers attend each weekly session. Ages (years \pm SD) were 17.1 ± 0.9 for adolescent mothers and 21.1 ± 1.7 for young adult mothers. Sixty percent of young adult (HMHB) mothers lived in houses along with immediate family members such as mothers, sisters, or husbands. The average household size for this group was 4.2 ± 1.2 members. Only 20% worked, while 30% were attending college. Forty percent of these young adult mothers had two children, and the average age of the youngest child was 12.2 ± 14.2 months. Ninety percent were recipients of WIC, while fewer than half received SNAP benefits. Also, four of these mothers had been adolescents when they gave birth to their child. In contrast to the HMHB mothers, only 40% of adolescent (TPMP) mothers lived

in houses and had a slightly higher average household size of 5.7 ± 2.3 members. These adolescent mothers also lived with immediate family members such as grandparents, parents, brothers, sisters, and boyfriends. Forty percent were still enrolled in high school, and 40% also worked. All adolescent mothers had only one child, with an average age of 16.7 ± 8.7 months. Seventy percent received WIC, while half of adolescent mothers were SNAP participants. Demographic data are presented in Table 2.

Key themes from participant narratives

Three themes emerged as central components that influenced eating behavior and beliefs of the participants. First, the participants shared their definitions for “healthy” versus “unhealthy” eating, along with the perceived importance of healthy eating and barriers against this practice. Second, mothers described how their cooking practices were influenced by shopping strategies along with impediments that prevented them from cooking at home. Third, participants gave an account of their daily patterns, including meal occasions, activities, and food choices.

Personal beliefs about healthy eating

Each participant was asked to describe her awareness of healthy versus unhealthy eating. Both groups of mothers gave limited and simplistic concepts of these two definitions. For adolescent (TPMP) mothers, healthy eating implied consuming vegetables, fruits, and chicken. Young adult (HMHB) mothers gave a similar account, which included eating fruits and vegetables, along with the correct portion sizes of food. As one adolescent mother stated:

A healthy diet is chicken, fish, and I guess sometimes turkey. The rest of the meats you are not supposed to eat, but people do it anyway. Fruits and vegetables, and the healthier fruits and vegetables, supposed to be, not cooked, light steamed, like that. I think that's, you know, eating fruits instead of picking up a cake or chips.

A basic concept of the notion of unhealthy eating was expressed by participants.

Adolescent mothers stated that unhealthy eating indicates consuming junk food, fried foods, sweets, and potato chips. Similarly, young adult mothers described the concept as eating junk food, greasy food, fast-food, and fried foods. One young adult mother explained it:

Eating junk food all day, eating fried foods every day, that's the bad, that's very bad.

The majority of participants felt that maintaining their own health was the reason why the practice of healthy eating was important of them. Mothers were concerned about health complications, such as becoming obese, or family disorders, like diabetes and high blood pressure. Less than 50% of each group mentioned that they were worried about their children's health, since they wanted these children to eat well.

Adolescent mothers identified several barriers to eating healthy foods which included limited resources, cravings for junk food and disliking the taste of healthy food. Young adult mothers listed only cravings for junk foods as a major obstacle in their being able to eat healthy foods.

Environmental influences on cooking/shopping practices

We asked participants about their cooking practices. Five adolescent mothers (50%) were the main cooks in their household, while the remainder received help from other household members such as sisters, mothers, and grandmothers. Foods that were commonly prepared included chicken, lasagna, spaghetti, and vegetables. This group enriched their cooking knowledge by viewing shows on the Food Network Channel (e.g., Paula Dean, Rachel Ray). Six young adult mothers (60%) did most of the cooking in the household, while the rest got some assistance from other household members such as mothers, sisters, or stepdads. The main foods the young adult mothers (HMHB) prepared were chicken, spaghetti, rice, and pork chops. In addition to viewing the Food Network Channel, this group also used cook books.

Both groups of participants shared two factors that prevented them from cooking frequently at home: not having enough kitchen space, such as small and cramped kitchens, and limited cooking utensils. Adolescent mothers (TPMP) said that their cooking efforts were also impeded by presence of other members of the household in the kitchen when they were trying to cook and insufficient food. Young adult mothers (HMHB) reported one additional issue: children needing attention while the mothers were trying to prepare meals. As one adolescent mother describes it:

When everybody in my way, cause it's so small [kitchen], and they're going in the back door, or when it's not enough pots to cook what you have to cook. Or when it's not like, sometimes we don't have side foods so we have to cook just the meat, we have to cook a whole bunch of it so that everyone to get full cause no side dishes to go with it.

Adolescent mothers either go by themselves to purchase groceries (40%) or with another household member (60%). The adolescent mothers shopped at stores that have lower prices or offer discounts, such as Wal-Mart and Food Lion, a regional Southeastern and Mid- Atlantic grocery store (www.foodlion.com/Corporate). Seventy percent of adolescent mothers are driven by family members or friends to the grocery stores. Half of these mothers reported using grocery lists when shopping while the rest walk through the different aisles and “grab what they want” from the shelves. Also, only 40% reported actively using coupons to save money on groceries, but these mothers were not making lists when going out shopping.

Young adult mothers reported similar strategies for grocery shopping, with 70% of participants reporting shopping by themselves. All 10 participants reported going to Food Lion to shop for better prices while five also shopped at Wal-Mart. Like the TPMP group, 70% of HMHB mothers were driven to a grocery store by family members or friends. Half of HMHB participants were using grocery lists and coupons when shopping for food. Three of the mothers who were using grocery lists were also using coupons.

Food shortages, due to lack of money and government assistance benefits such as WIC and SNAP running out, were identified as an impediment to cooking for both groups. Three TPMP and two HMHB mothers specifically stated that sometimes they did not have enough food to eat in the house. This tended to happen towards the end of the month when most of them had used up their SNAP and WIC benefits.

Food choices throughout the typical weekday

The Meal Pattern Timelines show that adolescent (TPMP) mothers spent most of their time at home or in school. Four participants worked an average of 20 hours per week. Wake up times for TPMP mothers varied between 5:00 AM and 12 PM, while their bedtimes were between 8:00PM and 12:30 AM, resulting in an average of 9.6 hours of sleep per night. Five TPMP participants never ate breakfast, while most always ate lunch and dinner. Two participants reported eating breakfast in school, while three consumed it at home. Fifty percent of mothers ate lunch at school. The majority of participants also reported consuming one snack per day (Table 3).

Those who ate breakfast reported eating mostly cold cereal and fast-food breakfast biscuits, and drank milk (usually 2% or lower) or fruit juice. Lunch consisted of French fries, cheeseburger/hamburgers, pizza, fried chicken, and vegetables. Regular soda and sweetened beverages were most commonly consumed. These foods and beverages were either consumed in the cafeteria as school lunch or at fast food places. At dinner, most participants ate baked and fried chicken, spaghetti with red sauce and ground beef, pizza, vegetables, French fries, rice, and mashed potatoes and drank soda, fruit juice, and water. Potato chips were the most commonly reported snack for adolescent mothers. Water, fruit juice, sugar sweetened beverages such as Kool-Aid or Sunny D, and soda were consumed between meals. The majority of adolescent mothers drank milk followed by consumption of cheese and yogurt (Table 4).

Young adult mothers (HMHB) spent most of their time at home. The two mothers who worked did so for an average of 30 hours per week. The wake up times for

this group were between 5:00 AM and 10:30 AM and bedtimes were between 10:00PM and 2:00 AM, resulting in an average of 7.3 hours of sleep per night. Four HMHB mothers never ate breakfast, while the majority consumed lunch and dinner mostly at home. Also, most of these mothers consumed one snack per day (Table 3).

Breakfast for HMHB mothers consisted of eggs (scrambled or boiled), cold cereal, and bacon, along with beverages such as milk and juice. For lunch, this group ate sandwiches, baked chicken, vegetables, and drank soda, water, fruit juice and sugar sweetened beverages. Dinner foods consumed included baked and fried chicken, spaghetti with red sauce and ground beef, pork chops, vegetables, and mashed potatoes. Dinner beverages included soda, water, fruit juice, and sugar sweetened beverages. Snacks included fruit, potato chips, and cereal. Beverages consumed throughout the day included water, fruit juice, and sugar sweetened beverages (Table 4).

Discussion

This research highlights the similarities and differences in knowledge and beliefs about healthy eating, in cooking/shopping practices, and in food choices of adolescent and young adult mothers enrolled in life skills programs at the YWCA of Greensboro. Also, this paper offers a general comparison of household size, work and school status of the two groups of participants. Both groups of mothers gave simplistic definitions of “healthy” versus “unhealthy” eating. “Healthy eating” was viewed as eating more fruits and vegetables, along with chicken, and correct portion sizes. A similar simplistic definition was reported by Croll and colleagues (2001) for a group of 203 adolescents who stated that “healthy eating” consisted of eating fruit, vegetables, salads, and lean

meats. In contrast to our findings, Stevenson and colleagues (2007) found that “healthy eating” meant elimination of unhealthy foods such as snacks, chocolate, sweets, and fast food in a group of teenagers. In another study, adults gave more complex definitions for “healthy eating” as eating natural foods or fresh foods such as vegetables, fish, brown bread, and salads (Povey et al., 1998).

We found that both groups of mothers defined “unhealthy eating” simplistically as consuming foods such as junk food, fried foods, and fast-food. This is consistent with Croll and colleagues (2001) who found that adolescent participants defined unhealthy foods as chips, candy, fast food, soda, and pizza. Povey and colleagues (1998) reported that adults define “unhealthy” eating in a more elaborate manner, such as the practice of consuming manufactured or processed foods and foods where the individual has no control over the preparation or the ingredients incorporated in the food, such as chips, beef burgers, sausages, cakes, sweets, and chocolate.

Mothers expressed concern over healthy eating due to fears of getting ill themselves or worry about their children’s health. This differs from the results of Story and Neumark-Sztainer (2002) who found that adolescents do not place much importance on health and nutrition since the long-term benefits of eating healthy do not prevail over short-term convenience of unhealthy foods. Our group likely differs from adolescents who are not mothers as they have responsibility for the well-being of their young children as well for themselves.

Adolescent mothers (TPMP) reported limited resources such as lack of food at home, lack of money to purchase foods, cravings for unhealthy foods, and unpleasant

taste of healthy foods as barriers to healthy eating, while the young adult mothers (HMHB) group listed only “cravings”. Similar to our results, Stevenson and colleagues (2007) reported that adolescents (ages 12-15) stated that unhealthy foods were pleasing due to their “good” taste, and in turn healthy foods, such as vegetables were described as unlikable due to their bland taste. Story and Newmark-Sztainer (2002) also reported that taste and sensory perception of food have the most significant influence on adolescent food selection. In contrast to our study participants, young adults in college have listed other barriers towards the practice of healthy eating, such as lack of time, easy availability of high-fat choices, tasteless vegetable options, limited kitchen facilities (Cason & Wenrich, 2002), and their significant other and their friends not liking to eat healthy foods (McArthur & Pawlak, 2011).

Both groups were dependent on others for shopping and needed economical strategies for shopping. Mothers stated that they often depend on others for rides to grocery stores, shop at stores that offer discounts on foods, and some use grocery lists. These results are similar to those of Hersey and colleagues (2001) who found that 51.4 % of Food Stamp participants looked for grocery specials, 50.1 % used a grocery list, 42.3 % stocked up on bargains, and 40.5 % used coupons. Kempson and colleagues (2003) also found that lack of transportation emerged as a barrier for limited resource mothers with young children. Their participants reported it was hard to walk to the stores, shop, and handle groceries while also pushing a stroller or carrying a child. Wiig and Smith (2008) found that low-income women have to walk or bike to grocery stores, or they have

to pay for a ride to the store (bus, taxi, informal taxi), or catch a ride with a friend or family member.

Lack of cooking equipment and limited kitchen space emerged as barriers to meal preparation for both adolescent and young adult mothers. The adolescent mothers also included the presence of other family members as a barrier, while young adult mothers were distracted by their children when trying to cook. Larson and (2006) also reported that young adults (18-23 years old) complained of inadequate cooking skills and inadequate resources as major barriers against food preparation. Household overcrowding was reported by Cooke and Owen (2007), who explored why teenage mothers seek their own housing; reasons included living with other siblings who also had their own children, stepsiblings, and even grandparents. Being part of a larger household can provide young mothers with housing and other support but may present challenges to their autonomy in caring for themselves and their child.

Almost half of our adolescent and young adult mothers skipped breakfast, which is consistent with other research. One study reported that 42% of a sample of 290 postpartum teen mothers reported eating breakfast fewer than two days per week (Haire-Joshu et al., 2011). Rampersaud and colleagues (2005) found that 59% of high school students skipped breakfast more than three times the previous week, while 37% of young adult participants were skipping breakfast in a study by Nickals and colleagues (1998). Also, Widome and colleagues (2009) found that food-insecure teens ate fewer breakfast meals.

Both groups of mothers ate similar foods with the exception of breakfast. This difference could be attributed to the fact that the young adult mothers who ate breakfast did so at home and thus cook their breakfast. Both groups consumed similar foods for lunch and dinner, such as chicken (both baked and fried), pizza, spaghetti, French fries, vegetables, fruit juice, and sugar sweetened beverages. Similarly, Larson and colleagues (2007), in a 5-year longitudinal study, found significantly lower daily consumption of fruits, vegetables, fruit juice, in a group of 2105 teenagers from early to late adolescents. Nielsen and colleagues (2002) reported higher consumption of salty snacks, candy, soft drinks, fruit drinks, alcohol, French fries, cheeseburgers, pizza, and Mexican food in a group of teenagers aged 12-18 years when comparing foods consumed by this population from 1978 until 1996. Widome and colleagues (2009) found that food insecure/limited resource youth also consume a greater percentage of calories from fat along with higher quantities of fast-food. Likewise, 93% of a group of 149 college students were noncompliant with vegetable/juice recommendations, 89% were not meeting the fruit/juice recommendations, and 88% were not meeting the dairy foods recommendations (McArthur and Pawlak, 2011). Therefore, the eating practices of the adolescent and young adult mothers in this study are generally similar to those reported by other researchers examining the dietary habits of adolescents.

A limitation of this research is the small number of participants in each group and also that they were all recruited from a single location, preventing the results from being generalized to all adolescent and young adult mothers. Additionally, these mothers are participating in programs offered by the YWCA and their beliefs and practices may be

different from other young mothers who are not part of such programs. However, these participants provided a unique opportunity to compare these two groups of single at-risk mothers.

In conclusion, both adolescent and young adult mothers stated simple definitions of “healthy” versus “unhealthy” eating practices, along with the importance of having a healthy diet. They participate in grocery shopping but experience barriers that prevent them from cooking in their homes. Last, they described their typical food choices throughout a weekday. By forming a CBPR partnership with the YWCA, formative research was conducted with the adolescent and young adult mothers in order to better understand their needs and plan for an appropriate nutrition intervention for these two groups. Nutrition interventions with young mothers need to include creative ways to improve knowledge about food and cooking and shopping skills in order to help them make healthier food choices for themselves and their children.

Implications

Using these results and in partnership with a local YWCA or other agency providing services to young mothers, a series of nutrition education and cooking sessions could be developed and incorporated into a life skills program provided by such agencies. Since adolescent and young adult mothers in our study had similar definitions of healthy and unhealthy eating, shared common factors that affected their shopping and meal preparation, and reported similar food choices, a single intervention could be designed for both groups. These classes could target selected topics, such as tips for shopping on a budget, food safety/sanitation, portion control, MyPlate, meal planning, and feeding your

child. Supervised cooking sessions using simple recipes that include whole grains, fruits and vegetables to help develop skills and increase mothers' confidence in preparing healthy meals for themselves and their children could also be included in the program.

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Table 2. Demographic characteristics

Characteristics	Adolescent (TPMP) mothers ¹ N=10	Young adult (HMHB) mothers ² N=10
Average age (y)	17.1 ± 0.9	21.1 ± 1.7
Living		
apartment	6 (60%)	4(40%)
house	4 (40%)	6(60%)
Household size	5.7 ± 2.3	4.2 ± 1.2
School Status		
11-12 th grade	4 (40%)	0
High School Graduate	5 (50%)	7 (70%)
College	1 (10%)	3 (30%)
Work Status		
Working	4 (40%)	2 (20%)
Not working	6 (60%)	8 (80%)
Age of child (months)	16.7 ± 8.7	12.2 ± 14.2
Gender of baby		
male	6 (60%)	3 (30%)
female	4 (40%)	6 (60%)
unborn	0	1 (10%)
WIC enrollment ³	7(70%)	9 (90%)
SNAP enrollment ⁴	5 (50%)	3 (30%)

¹ TPMP = Teen Parent Mentoring Program

² HMHB = Health Mom Healthy Babies Program

³ WIC = Special Supplemental Food Program Women, Infants, and Children

⁴ SNAP = Supplemental Nutrition Assistance Program (formerly known as Food Stamp Program)

Table 3. Meal patterns of mothers who participated in meal pattern timeline interviews

Variable	Adolescent (TPMP) mothers ¹ (n=10)	Young adult (HMHB) mothers ² (n=10)
Wake time	5:00 AM-12:00 PM	5:00 AM-10:30 AM
Sleep time	8:00 PM- 12:30AM	10:00 PM- 2:00 AM
Breakfast frequency		
Never	5	4
Sometimes	0	1
Always	5	5
Lunch frequency		
Never	1	1
Sometimes	0	0
Always	9	9
Dinner frequency		
Never	0	0
Sometimes	0	0
Always	10	10
Number of snacks		
None	1	1
1	7	6
2	2	3
Breakfast location		
Home	3	6
School	2	0
Lunch location		
Home	3	6
School	5	2
Other	1	1
Dinner location		
Home	9	9
Work	1	1

¹ TPMP = Teen Parent Mentoring Program

² HMHB = Health Mom Healthy Babies Program

Table 4. Reported food choices of mothers [(n/%)]

Variable	Adolescent mothers (TPMP) ¹ (n=10)	Young adult mothers (HMHB) ² (n=10)
Breakfast foods and beverages		
eggs (scrambled or boiled)	0 (0)	5 (83)
cereal	4 (80)	3 (50)
bacon	0(0)	3 (50)
milk	4 (80)	2 (33)
fruit juice	2 (40)	3 (50)
Lunch foods and beverages		
sandwich	1 (11)	5 (56)
pizza	3 (33)	2 (22)
cheeseburger/ hamburger	4 (44)	1 (11)
French fries	6 (67)	1 (11)
chicken- baked/ grilled	2 (22)	4 (44)
chicken-fried	3 (33)	2 (11)
vegetables (other than fries)	4 (44)	2 (22)
fruit juice	2 (22)	4 (44)
sugar sweetened beverages	7 (77)	6 (66)
Dinner foods and beverages		
baked/grilled chicken	5 (50)	8 (80)
fried chicken	6 (60)	3 (30)
spaghetti-(red sauce+ hamburger meat)	3 (30)	5 (50)
pizza	3 (30)	2 (20)
salad/vegetables as a side dish	9 (90)	6 (60)
rice	4 (40)	2 (20)
mashed potatoes	3 (30)	4 (40)
fruit juice	6 (60)	3 (30)
sugar sweetened beverages	9 (90)	10 (100)
water	4 (40)	4 (40)
Snacks		
fruit	0 (0)	3 (33)
potato chips	5 (63)	2 (22)
cereal	1 (13)	4 (44)
Beverages		
water	5 (50)	5 (63)
juice	5 (50)	4 (50)
sweetened beverages	8 (80)	4 (52)
Eat or drink dairy products		
cheese	7 (78)	10 (100)
milk	8 (89)	7 (70)
yogurt	3 (33)	4 (40)
Drinks caffeinated soft drink?		
	7 (70)	6 (60)

¹ TPMP = Teen Parent Mentor Program

² HMHB = Healthy Mom, Healthy Babies Program

CHAPTER IV

DEVELOPMENT AND IMPLEMENTATION OF NUTRITION EDUCATION CLASSES AND COOKING SESSIONS INTO AN EXISTING LIFE-SKILLS PROGRAM AT THE YWCA OF GREENSBORO, NC

This chapter is an article that will be submitted to the journal Health Promotion Practice

Abstract

Nutrition education has been successful in improving the dietary intake and other health behaviors of pregnant and parenting low-income women. The Young Women's Christian Association (YWCA) of Greensboro, NC, provides life-skills programs for both adolescent and young adult mothers. A community-based participatory research approach was used to plan a series of seven nutrition education classes and cooking sessions that were integrated into an existing life-skills program for these mothers. Sessions were held on Tuesday evenings, with a few mothers arriving early each week to help prepare the meals that were planned to incorporate more fruits, vegetables, whole grains, and lower fat recipes. The YWCA staff reported that the classes were successfully incorporated into their existing program and that the program supported their goals of having mothers learn healthy eating information and food preparation skills. However, reception to the program was better among the young adult mothers than adolescent mothers, who appeared more attentive during the classes and interacted more

with the student researcher who delivered the classes. Given the difference in reactions to the program, future studies should focus on creating and testing different intervention formats for each group of mothers.

Keywords: adolescent mothers, young adult mothers, community-based participatory research, nutrition education classes, cooking sessions

Introduction

Inadequate nutrition intake has been reported among single limited-income pregnant and parenting mothers (Moran, 2007; Giddens et al., 2000; Pobocik et al., 2003; Haire-Joshu et al., 2011). A number of interventions have improved the dietary intake of adolescent mothers, resulting in shorter hospital stays, reduced low birth weight rates, and positive skills/behavior change in some dietary practices (Dubois et al., 1997; Hun et al., 2002; Owen, Kendall, & Wilken, 1997; Long, Martin, and Janson-Sand, 2002).

Nutrition interventions have also been successful with low-income pregnant and parenting adults in enhancing nutrition knowledge, increasing total energy intake and consumption of folate, calcium, and iron, and increasing infant birth weight (Widga & Lewis, 1999; Clarke et al, 2007; Briley, Flanagan, & Lewis, 2002).

Disseminating nutrition education interventions in community settings can be a challenge (Harrop et al., 2012). Often interventions developed for community groups do not take into account existing programs that are successful for these groups or the competing needs of the agencies delivering the programs. Community-based participatory research (CBPR) can be a useful approach for developing and testing salient

programs that fit the needs of the target population and the community agencies that serve them. CBPR includes community agencies and researchers, and has resulted in successful research projects (Minkler & Wallerstein, p 48). The main goal of such research is to become integrated in the community, to learn the beliefs and perceived needs of that community, and to develop programs which are more effective. Researchers work together with community members to identify the research question, design and implement the research plan, and make sense of the results of the work conducted. One approach for developing and testing effective interventions that are salient for both the target population and the community agencies is to design a “program within the existing program”.

The Young Women’s Christian Association (YWCA) of Greensboro provides a wide range of effective programs and services for women of all ages. Training in life-skills is a key component of the YWCA of Greensboro programs for adolescent and young adult mothers (www.ywca.org). This high risk population has specific needs and nutrition education programs can be developed for implementation as part of the life skills curricula already available at the YWCA. The purpose of this paper is to a) describe how a series of nutrition education classes and cooking sessions were designed to be incorporated into a life skills program offered by the YWCA for adolescent and young adult mothers, and b) discuss the benefits of conducting such a “program within an existing program”.

Planning phase

The YWCA: a promising setting for health-interventions

The YWCA in Greensboro, North Carolina, provides a variety of programs for adolescent and young adult mothers such as the Teen Parent Mentoring Program (TPMP), Healthy Moms Healthy Babies (HMHB), and Teens Learning Childbirth. Evidence collected by the YWCA suggests several health benefits associated with participation in YWCA programming (C. Dobson, personal communication, March 16, 2012). The Greensboro YWCA serves over 200 pregnant and adolescent mothers annually and reports that fewer than 2% have repeat births each year compared to an overall 25-30% repeat birth rate in Guilford County (C. Dobson, personal communication, March 16, 2012). The YWCA program specifically designed for adolescent mothers is the Teen Parent Mentoring Program (TPMP). This program is a relationship-based, long-term comprehensive program that aims to support teen moms (13-19 years) in their roles as parents, students, and young women (www.ywca.org).

The Greensboro YWCA also serves close to 200 young adult mothers each year, through the Healthy Moms Healthy Babies (HMHB) program. Only 7.3% of these mothers' pregnancies resulted in low birth weight infants over the past four years compared to 11.9% of minority adults ages 20-29 in Guilford County (C. Dobson, personal communication, March 16, 2012). The HMHB program, for single women 20-30 years old and their children, is designed to help young women have healthy pregnancies, healthy children, and maintain a healthy lifestyle between pregnancies. Both the TPMP and HMHB programs are held every other Tuesday night at the YWCA.

The mothers meet as a group and take part in different activities to enhance their lifestyles and personal relationships.

The YWCA staff (n=6) has a diverse educational background which helps the TPMP and HMHB programs to be successful. Some of the degrees include psychology (clinical and counseling), sociology, peace and conflict studies, and a master of education. This varied educational background aids the staff in achieving many of the tasks they perform at the YWCA such as program planning, coordination, and facilitation for a number of programs such as Childbirth Education, Teen Family Literacy Programming, Interconception Health, Teen Parent Mentoring Program, and Healthy Moms Healthy Babies. Other duties include case management, transportation of mothers to programs and other appointments, such as doctor's appointments, program planning for summer camps, doula training, along with referrals to other community resources. The staff also coordinates child care for the mothers at an offsite location while mothers are attending their life-skills programs.

The YWCA is an appropriate venue to conduct nutrition education as part of health interventions for adolescent and young adult mothers because a) it is recognized by other agencies and people living in the community as an important organization serving young at-risk mothers, b) it has a successful history of providing beneficial programs that improve pregnancy and parenting outcomes for the targeted young mothers, and c) it successfully maintains its enrollment of adolescent and young adult mothers who want to improve their lives.

The CBPR approach

The YWCA collaborates with different agencies and community partners to improve the programs they offer to adolescent and young adult mothers. Given the high-risk nature of young pregnant mothers and young women who are of childbearing age, the YWCA designed the program Being Your Best Self. This program was initially developed as a collaboration between the YWCA staff and professors from the Department of Nutrition, Department of Social Work, Department of Human Development and Family Studies, Department of Nursing, and a statistician. This multi-year project was created to help motivate women to improve their preconception and interconception health and pregnancy outcomes through the prevention of unhealthy behaviors, risk management, and promotion of healthy behaviors. The target population is 200 women of reproductive age who are at high risk of adverse pregnancy outcomes due to homelessness, interpersonal violence, unhealthy housing, poverty, poor diet and fitness, alcohol consumption, and/or racial disparity. The main outcomes of this collaboration were increased knowledge, behaviors, and self-efficacy in preconception health. Being Your Best Self is being offered to both adolescents and young adult mothers, who can also bring along a friend to enhance the peer reinforcement factor in implementing and maintaining healthy lifestyle changes.

Acknowledging the success of the YWCA in improving the lives of these mothers, a CBPR approach was used to partner with the YWCA of Greensboro to develop and implement seven nutrition education classes and cooking sessions that would target the “poor diet” component that is part of the Being Your Best Self program.

Previous collaborations with the YWCA that involved series of nutrition education and cooking classes were held with groups of 10-12 adolescent mothers at a separate location than the YWCA. The adolescent mothers would be transported from the YWCA to a local church in Greensboro that volunteered its kitchen facilities, cook there and eat the prepared meal together, and return to the YWCA. Due to budgetary constraints, the nutrition education and cooking classes were designed to be included as part of Being Your Best Self program, and be conducted at the YWCA facility, using the existing kitchen. The establishment of the partnership with YWCA is described in another paper.

Conceptual framework

The conceptual development of the nutrition education classes and cooking sessions combined results from a previous needs assessment of YWCA adolescent and young adult mothers along with the framework of the Social Cognitive Theory (SCT) (Bandura, 1997) (complete results of needs assessment reported in another paper). According to Bandura, human behavior can be seen as an interaction between three aspects: behavior, personal factors, and environmental influences. These three factors interact and influence each other to promote health behaviors. Reciprocal determinism, a critical construct in SCT, states that if each component has a reinforcing effect on the other components so that if one component changes a transformation will occur in another. Based on the results of the needs assessment study, both groups of mothers had simple ideas about healthy eating. They also faced challenges that prevented them from cooking at home, such as lack of cooking utensils and small kitchens, even though the

young adult mothers tended to cook more than the adolescent ones. Also, mothers had similar food choices that consisted of fast food and sugar sweetened beverages.

Figure 2 shows an adaptation of the Social Cognitive model that is tailored to our population of adolescent and young adult mothers. Our intervention was designed to affect change in both the personal and environment components, which should alter dietary behavior. Under Environment, the intervention was designed so that the mothers would experience an increase in social-emotional support. Increase in support would occur through the opportunity to bond and interact with each other by participating in both the nutrition education classes and cooking sessions. Also by attending the program sessions, mothers would increase their nutrition knowledge, cooking knowledge, and self-efficacy towards cooking and eating healthy (Personal component). For example, a taste testing activity was conducted during the class focused on reducing fat intake in which the participants were asked to identify low-fat versus regular-fat food products. This activity was included to reinforce the nutrition knowledge message about eating lower-fat products and increase mothers' self-efficacy about tasting and eating healthier food products (Behavioral capabilities + Reinforcements). A food tasting activity was also chosen because participants in the needs assessment study complained about the taste of healthy foods and also because food neophobia is common among adolescents and young adults (Rigal et al., 2006; McFarlane & Pliner, 1997; Martins, Pelchat, & Pliner, 1997). According to the model, changes in personal and environmental attributes achieved through attendance in program sessions, would lead to change in nutrition-related behaviors, such as increased consumption of fruits vegetables, decreased meal

skipping, increased snacking, and decreased consumption of fast food and sugar sweetened beverages.

Methods

Intervention description

Seven nutrition education classes and cooking sessions were developed and implemented as part of the YWCA life-skills program Being Your Best Self. Following the cooking session, the prepared meal was served to all program participants. While the mothers were eating, the student researcher delivered the nutrition education lesson for that evening.

The cooking sessions were designed so that up to four mothers attending the program would prepare the evening meal for all program participants under the guidance of undergraduate and graduate nutrition students from the University of North Carolina at Greensboro. The student researcher identified simple recipes that would help incorporate key principles of the nutrition education classes: decrease fat intake, increase fruit and vegetable consumption, and increase whole grain foods. Each meal provided a main dish, a side dish, and a dessert, with water offered as the beverage. Several recipes were chosen based on preferences identified by the mothers during the first class of the Being Your Best Self program. Recipes used canned, frozen, and fresh fruits and vegetables to demonstrate the variety of food sources available to help achieve an increased consumption of such foods. Whole grains were incorporated through pasta, tortillas, bread for sandwiches, and toppings for baked fruit desserts. Mothers who volunteered for the cooking sessions could potentially learn new skills in preparing the recipes and

helping to present the food items to the other program participants. The mothers who helped prepare the evening meals were recognized in front of their peers and praised for their efforts. All mothers attending the YWCA programming nights were eligible to participate in the nutrition education and cooking classes. Usually, 10 to 15 young adult (HMHB) mothers and 15 to 20 adolescent (TPMP) mothers attend each programming night, in addition to five YWCA staff.

The YWCA purchased the foods requested using a grocery list created for the recipes to be prepared for each class session. Each set of recipes was prepared twice as the adolescent (TPMP) and young adult (HMHB) mothers meet separately on alternating Tuesday evenings. Participants who volunteered to arrive 30 to 45 minutes before the start of each Tuesday program to help prepare the recipes for that evening were brought to the YWCA by the staff attending the program night. Once the food was ready, it was served to all mothers and YWCA staff attending either the TPMP or the HMHB program that night.

During the meal, the student researcher delivered the nutrition education lesson. All nutrition education lessons were designed to fit in a 30 minute time slot to ensure that the rest of the activities planned by the YWCA staff would fit in the 2.5 hour period allotted for programs that evening. For each nutrition education lesson, a detailed script was developed to ensure that both groups received the same lesson content. Also, each session included a reinforcing activity that required participants to complete various tasks. The YWCA staff reviewed the lesson plans and made format suggestions based on

their experiences in programming education sessions for the two groups of mothers. The class topics and each activity are presented in Table 5.

Education materials

Education materials were developed based on the lesson content for each of the seven sessions. For example, for class number 2 that focused on the topic of “Fat”, handouts were designed to introduce participants to the four types of fats present in the diet, along with ways to eat less fat. The handouts were colorful, used medium to large font for ease of readability, and featured images and messages related to the lesson content.

Participant recruitment

As our CBPR partner, the YWCA staff helped the student researcher recruit study participants. Since the YWCA target population is adolescent and young adult mothers, participants were recruited from both the TPMP and the HMHB programs. The student researcher attended a session for each program and presented details about the project, what the mothers were required to do in the study, and potential benefits of participating. The YWCA staff encouraged mothers to enroll in the study. The student researcher explained that study participants would be required to complete questionnaires at the three time points of the study, besides being part of the cooking sessions. Those over 18 years of age completed consent forms, and assent was obtained from participants under 18 years along with parental consent. Interviews were conducted at the YWCA facility. The Institutional Review Board of the University of North Carolina at Greensboro approved the study protocol.

Included in the cooking sessions were mothers who were enrolled in the Being Your Best Self program but were not part of the nutrition intervention. To ensure that everyone got a chance to cook, at the end of each nutrition education class, the student researcher, along with the help from the YWCA staff, selected volunteers for the next cooking sessions. These mothers were asked if they had helped cook previously, and if their response was affirmative, then they were asked to let someone new help cook.

Data collection

Face to face interviews were conducted at the YWCA facility. Each interview lasted approximately 30 minutes. Interviews were conducted at three time points: pretest, posttest (following the completion of all seven nutrition classes and cooking sessions), and follow-up (one month after posttest). Participants received a gift bag containing a variety of kitchen utensils (e.g., measuring spoons, measuring cups, liquid measuring cups, spatulas, kitchen towels, hot pads, or a cookbook) for completing the survey designed for each study time point.

Data instruments

General Demographics questionnaire: All enrolled study participants completed a general demographics questionnaire that included socio-demographics, and self-reported height and weight. This questionnaire was administered only at the pretest point of the study.

Evaluation survey: All enrolled study participants completed an evaluation survey at the posttest time point. These participants rated how helpful the class sessions were for each week on a scale of 1-6, (1= not helpful, 5 = very helpful, 6 = did not attend/receive item).

They also evaluated the helpfulness of ideas presented during each lesson, the recipes cooked for each session, the activities performed during each class, and how often the recipes were prepared at home by the participants using the same scale of 1-6. The study participants were also asked to describe any factors that prevented them from cooking at home, and how often they read the materials offered to them during the class on their own.

Follow-up survey: All enrolled study participants were invited to complete a follow-up survey one month after the posttest time point, which asked how often mothers were still using the handouts from each class using a scale from 1-6 (1= rarely using, 5= using very often, 6= not using/reading). These participants were also asked if they were using the recipes they received from the cooking sessions, and how often they prepared these recipes at home using the same scale of 1-6.

Staff evaluation survey: The YWCA staff (n=5) that attended the nutrition education classes and cooking sessions was also asked to complete a brief survey following the conclusion of the program. They were asked to state their general opinion of the classes, what worked best and what did not work as well for the two groups of mothers, if the classes fit with the overall program offered at the YWCA, and whether they can foresee a continuation of the classes.

Attendance: Attendance was determined by having the program participants complete sign-in forms before the start of each session as required by the YWCA for their program evenings.

Observation notes: Each class evening, the student researcher's delivery of the nutrition education class was observed. The student researcher also noted the attendance and participant interactions during the cooking sessions, meal time, and the nutrition education class activities.

Data analysis

Means were computed for some demographics variables such as age, child age, number of people in the household, height, and weight. Chi square analysis was performed for the remainder of the demographic variables, such as race, education, WIC, and SNAP benefits. Frequencies were computed for the scaled answers of the evaluation and follow-up surveys. Means were computed for attendance rates.

Results

Participant characteristics

Twenty-six total study participants were recruited. Thirteen young adult (HMHB) mothers returned signed consent forms. Two mothers relocated and dropped out of the YWCA program, three participants attended fewer than two of the seven classes, one mother could not be contacted at the posttest time point due to a disconnected phone number, and one additional participant could not be contacted at the follow-up time point. A total of six mothers remained enrolled in the HMHB group throughout the program intervention. Thirteen adolescent (TPMP) mothers returned signed parental consent forms along with their assent form. Four mothers could not be reached at the baseline time point due to disconnected phone numbers, and one participant did not complete the baseline questionnaires entirely, leaving eight mothers enrolled in the study. Overall,

pretest, posttest, and follow-up data were collected from 14 total mothers (eight adolescent and six young adult mothers), resulting in a 54% retention rate.

Demographic data for the study participants are presented in Table 6. The two groups of mothers differed by age, since this variable was a criterion for each program. The young adult (HMHB) mothers had a higher mean age, and were more educated than the adolescent mothers. Eighty-three percent of the young adult mothers and 75% of adolescent mothers were African American. Sixty-seven percent of young adult mothers were enrolled in WIC, and 50% also received SNAP benefits, while 88% of adolescent mothers were receiving WIC, and 38% were enrolled in the SNAP program. Based on self-reported heights and weights, four young adult mothers (67%) and one adolescent mother (12.5%) were classified as obese based on BMI calculations. Two young adult (HMHB) mothers were adolescents when their child was born. Also, two of the young adult mothers had been part of the TPMP program before continuing in the HMHB program.

Nutrition education classes and cooking sessions observation data

The Being Your Best Self program began in early March 2011 with the nutrition education classes and cooking sessions beginning mid-March and continuing until July 2011 at the YWCA. The 14 participating mothers who completed the study attended an average of 5.3 nutrition education classes of the seven. Seventy-nine percent of mothers attended five or more classes. Two young adult (HMHB) mothers and three adolescent (TPMP) mothers had perfect attendance. However, study participants were able to cook no more than twice during the seven cooking sessions. Since the nutrition education

classes and cooking sessions were part of a program within an existing program, all mothers attending the YWCA programming nights were able to sign up to help during the cooking sessions, resulting in a low cooking dose for the mothers who were enrolled in the nutrition intervention study.

The two groups of mothers displayed differences in their responses to the nutrition education classes based on observations by the student researcher. The young adult (HMHB) mothers were eager to come in early and help cook. They interacted well during the cooking sessions and made suggestions and helped each other. They also acknowledged that several recipes they wanted to learn to prepare were incorporated into the cooking sessions. Overall, all young adult mothers that were part of Being Your Best Self program interacted well with each other during the nutrition education classes and gave each other advice on different matters. Participants seemed to trust the student researcher who was delivering the nutrition lessons because they freely answered questions posed by the student researcher. They also appeared comfortable asking the student researcher questions about the lesson material along with other nutrition areas in which they were interested.

The adolescent (TPMP) mothers were also enthusiastic regarding the cooking sessions. They enjoyed coming in early on Tuesday evenings to help prepare meals for their friends and learned to use new foods, such as fresh garlic to prepare garlic bread. These mothers generally needed more guidance and assistance than the young adult (HMHB) mothers from the nutrition students. During the nutrition education classes, the adolescent mothers did not seem as comfortable with the student researcher as the young

adult (HMHB) mothers were. The adolescent mothers did not volunteer to answer questions posed by the student researcher, so they were picked at random by the researcher to offer an answer. This group also did not appear as attentive during the nutrition education classes, as some of them were having side conversations with their neighbors at the table while the lesson was being presented. Initially, adolescent mothers did not appear to be comfortable with all of the participants that were part of the TPMP group present and preferred to arrange themselves in small groups of friends and only interact with people in their smaller group. All of these participants enjoyed small group work, particularly the more competitive activities that were part of each lesson. As the lessons progressed, the adolescent mothers did interact more during classes by volunteering answers to the questions posed by the student researcher.

Posttest and follow-up evaluation of the program

Mothers enrolled in the nutrition intervention did not have problems understanding the nutrition information and handouts presented to them during each class. At posttest, sixty-seven percent of study participants affirmed that the handouts were very helpful. Also, 71% of mothers stated that they reviewed the program handouts once per week. Only one participant stated that she did not review the materials at all. At the follow-up, only 43% of participants were still using the handouts, with the ones from class 1 (Safety in the Kitchen) and class 7 (Feeding your child) reported as “most used”.

Overall, 64% of mothers reported the recipes of the foods prepared during the cooking sessions to be very helpful. The recipes that were most liked by study

participants were from classes two (barbeque chicken, potato salad, and fruit pizza), and three (chicken or tuna sandwiches, butter glazed carrots, and peach ginger crumble). Even though the recipes were viewed positively, the majority of the study participants reported not preparing these recipes at home at posttest. The same question was asked on the follow-up survey and the majority of mothers still replied that they were not preparing the recipes cooked during the classes.

Mothers were asked to list any factors that prevented them from attending the intervention classes. Seventy one percent stated no factors, while the rest listed their children being sick or themselves being tired and not wanting to make the trip to the YWCA. Study participants were also asked to specify what they would do to change the nutrition education classes and cooking sessions. Fifty percent stated that the program did not need any improvements as it was fine the way it was delivered. One participant suggested adding a field trip to a grocery store as part of the program. Two mothers suggested making the cooking component more of a one-on-one interaction. Additional suggestions were to make the program available for the fathers and to offer better menus.

Staff evaluation of the nutrition education classes and cooking sessions

The YWCA staff was also asked to evaluate the nutrition education classes and cooking sessions. All of the staff reported that the program was well designed and offered an opportunity for the mothers to learn new skills, gain knowledge in the area of nutrition, and taste new foods. One staff member complimented the program as being “well-conceived, well-researched in terms of the interests and knowledge of the moms, and implemented in a manner consistent with other YWCA programming”. In the

opinion of the staff members, the cooking sessions were one of the best parts of the program since they observed that the mothers were enthusiastic about signing up for this activity and wanted to come back multiple times to help prepare meals. The staff also observed that as the classes progressed, the mothers felt more comfortable with the student researcher and looked forward to the sessions each week. Several staff also reported that in discussions with mothers after the classes ended, several shared the changes they were making in their cooking and eating habits. One barrier the staff felt made the program challenging was not being able to transport mothers to the YWCA facility on time for the cooking sessions. The staff expressed hope for continuation of the program, particularly if they could secure funding for it. They believe this program is needed since most of their participants eat diets that consist of less healthy foods and the mothers do not know or have the confidence to prepare healthy meals.

The nutrition education classes and cooking sessions also had an impact on the environment of the YWCA. Prior to this intervention, the staff ordered pizza or sandwiches for the meals offered during the programming nights. At the conclusion of the seven nutrition education classes and cooking sessions, the staff continued the practice of providing healthy cooked meals for mothers in both programs. Each week, staff would come in early on Tuesday and prepare meals for the programming evenings using the YWCA kitchen facility. Some of the staff members would also prepare meals at home and then bring them to the YWCA facility to be reheated and served at night. This was an important improvement in helping reinforce the message of healthy eating to the mothers attending the programming nights.

Overall, the nutrition education classes and cooking sessions were well liked by both the mothers attending this program and the YWCA staff. All mothers were especially enthusiastic about the cooking opportunities that were offered. The two groups of mothers differed in their receptiveness to the nutrition education lessons, with the young adult (HMHB) mothers being more open and interacting more with the student researcher. The majority of mothers liked the class topics, the recipes cooked, and the handouts designed for each lesson. Mothers and YWCA staff reported they learned new information and skills for food preparing from the program. The YWCA staff foresees a continuation of such a program if funding is obtained in the near future.

Discussion

A series of seven nutrition education classes and cooking sessions were successfully incorporated into the life-skills program, Being Your Best Self, offered by the YWCA of Greensboro. By including these classes in the Being Your Best Self program, the YWCA was able to address the area of “poor diet” that was part of the large project. The participating mothers and the YWCA staff found the classes to be beneficial in terms of learning new skills and gaining nutrition knowledge.

In the beginning of the nutrition education classes, the adolescent mothers were not as trusting of the student researcher as the young adult mothers, but they became more open and comfortable as the lessons progressed. Everyone enjoyed the activities that were part of the classes, since they enjoyed being challenged and competing with each other. The topics of the classes were carefully selected to fit the population and

their needs, such as learning to shop on a budget since most of the mothers have limited financial resources.

The cooking sessions were all liked by all of the mothers. Everyone was eager to sign-up to help cook. Mothers learned to cook different and healthier recipes than they were used to preparing. Adolescent mothers learned skills in handling knives and using new ingredients. The cooking sessions were also a great opportunity to let the mothers socialize among themselves. Still, the cooking dose was low for mothers enrolled in the nutrition intervention program, since the sessions were open to all participants who were attending the Being Your Best Self program and also because of the limited kitchen space. Having a larger kitchen facility or limiting the cooking sessions to the mothers enrolled in the intervention study would have provided a larger cooking dose for the participants.

The CBPR partnership with the YWCA offered the student researcher the appropriate venue for recruiting participants to be enrolled in the nutrition education classes and cooking sessions. Having the student researcher attend programming nights before the start of the nutrition education classes and cooking sessions allowed potential participants become familiar with and accustomed to her. Another important benefit of this partnership was that the student researcher was able to use the YWCA kitchen facilities for the cooking sessions so mothers could help prepare the evening meals. The YWCA staff was instrumental in helping the student researcher recruit study participants and coordinate transportation to ensure that some mothers could arrive early for the cooking sessions to help prepare the evening meal. The staff also reviewed the script and

the handouts created for the participants and made suggestion for changes so that the materials were appropriate for the participating mothers.

The nutrition education classes and cooking sessions were likely well received because they were integrated within the *Being Your Best Self* life skills program at the YWCA. This program was designed to enrich the preconception and interconception health and improve the pregnancy outcomes of the participants, and the nutrition classes were planned to fit with the overall program goals. By integrating the classes to be part of YWCA programming on Tuesday nights when transportation is provided, the student researcher was assured that mothers would come to the YWCA facility and participate in the activities planned for that evening. If the nutrition education classes and cooking sessions were to take place on a different night of the week as a separate program, coordinating transportation of the mothers to the YWCA would have been very challenging, due to scheduling and budgetary issues. In addition, the majority of the mothers are either in school, working, or both, so that getting to the YWCA an extra night during the week might not be feasible. The YWCA staff has many program responsibilities and probably could not have added an extra night of programming to their schedule.

The program seemed more favorably received by the young adult (HMHB) mothers than the adolescent mothers. Even though both groups of mothers were eager help cook the evening meal, the young adult mothers seemed more interested in the nutrition education lessons than the adolescents. The young adult mothers also appeared to pay more attention during the classes and interacted better with the student researcher

by answering questions and giving advice to one another. An explanation for the difference in attitude between the two groups could be that the young adult mothers are more mature and have more life experience, live in slightly smaller households than do the adolescent mothers and likely have more autonomy over their lives. Most adolescent mothers live with more family members and are less likely to have as much decision making with regard to household food purchase and preparation. The budget of the adolescents could be more limited due to their education level, which can impact their ability to secure a full time job. The adolescents might have been less open to the student researcher initially, since she is more similar in age to the young adult mothers, and they might viewed her as an authoritative figure.

The YWCA staff reported that the environment was changed as a result of the nutrition education classes and cooking sessions. The staff recognized the importance of providing cooked meals to their participants as a means to reinforce the messages regarding healthy eating presented during the nutrition education classes. After the completion of the nutrition education classes and cooking sessions, the YWCA staff continued to cook meals for their participants on Tuesday evenings instead of engaging in their previous practice of ordering pizza or sandwiches. Preparing meals for each program may be difficult for the YWCA staff to continue due to time constraints and facility resources. The YWCA staff prepares the program each Tuesday night, inviting speakers, doing case management and home visits, taking mothers to doctor's appointments or transporting them to programs, training doulas and mentors, and holding

different camps during summer. Partnering with a local university nutrition department could help enable this aspect of life skills programming to be continued.

This was a learning experience for everyone involved in the study, the participating mothers, the student researcher, the YWCA staff, and the nutrition students who helped with meal preparation. Everyone had to learn to adapt to new situations and improvise to get things done. The student researcher learned a lot about designing and implementing a study in the community, interacting with participants, and teaching nutrition education classes and cooking sessions.

One limitation of the study is the small self-selected sample of participants who completed the study. Another limitation of the study is that some of the mothers arrived late for the cooking sessions or the nutrition education classes, or they would not come at all. Although the YWCA provides free transportation to mothers interested in attending the programs, mothers reported that their children being sick was one of the main barriers for not attending all nutrition education classes and cooking sessions they had intended to attend. Also, some participants might have trouble reaching the YWCA to use the free transportation provided due to high numbers of disconnected phone numbers, since most of these mothers have limited financial resources as indicated by the high enrollment in Special Supplemental Food Program Women, Infants, and Children (WIC) and Supplemental Nutrition Assistance Program (SNAP) government assistance programs. This study also was not able to affect the home environment of the participating mothers, which could be an explanation for why the mothers were not cooking the recipes presented during the classes at home. These results may not be generalizable to other

adolescent and young adult mothers who do not participate in programs at the YWCA of Greensboro.

Conclusion

This article highlights how a series of nutrition education classes and cooking sessions for adolescent and young adult mothers were integrated into an existing life skills program offered by the YWCA of Greensboro, along with advantages of conducting such a program. This program has the potential to increase cooking skills and nutrition knowledge, and change the dietary intake of the participating mothers. After observing the distinct ways in which the adolescent and young adult mothers interacted during the program, different intervention formats may be needed for each group. The way the classes were implemented appeared to engage the young adult mothers, so the current format may be an effective intervention for this group. The adolescent mothers were not as receptive to a lecture and discussion style format even though activities were part of each lesson, but they interacted well when doing group work. For these mothers, the classes should be designed to include group work, competitive activities between groups, or games to obtain better results to enhance their engagement in the classes. An intervention could be designed for the adolescent mothers to get other family members involved in the cooking classes. Since the adolescent mothers live in households containing a large number of relatives, and they likely have limited or no choices regarding food purchases and preparation, designing a program to include some other family members in the classes so that they understand the importance of making better overall dietary choices may be a more effective approach. For all mothers, an

intervention should be designed to allow all of them to participate in more cooking sessions, since these were reported as being enjoyed the most. These nutrition education classes were designed to improve mothers' knowledge about selecting healthier foods for themselves and their children, improve skills and confidence in preparing healthier meals, and provide long term benefits of better dietary habits and overall health. The YWCA of Greensboro is committed to providing a variety of life-skill programs for young mothers, and these nutrition education classes and cooking sessions fit well into these program goals.

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Figure 2. Proposed model explaining a program for adolescent and young adult mothers

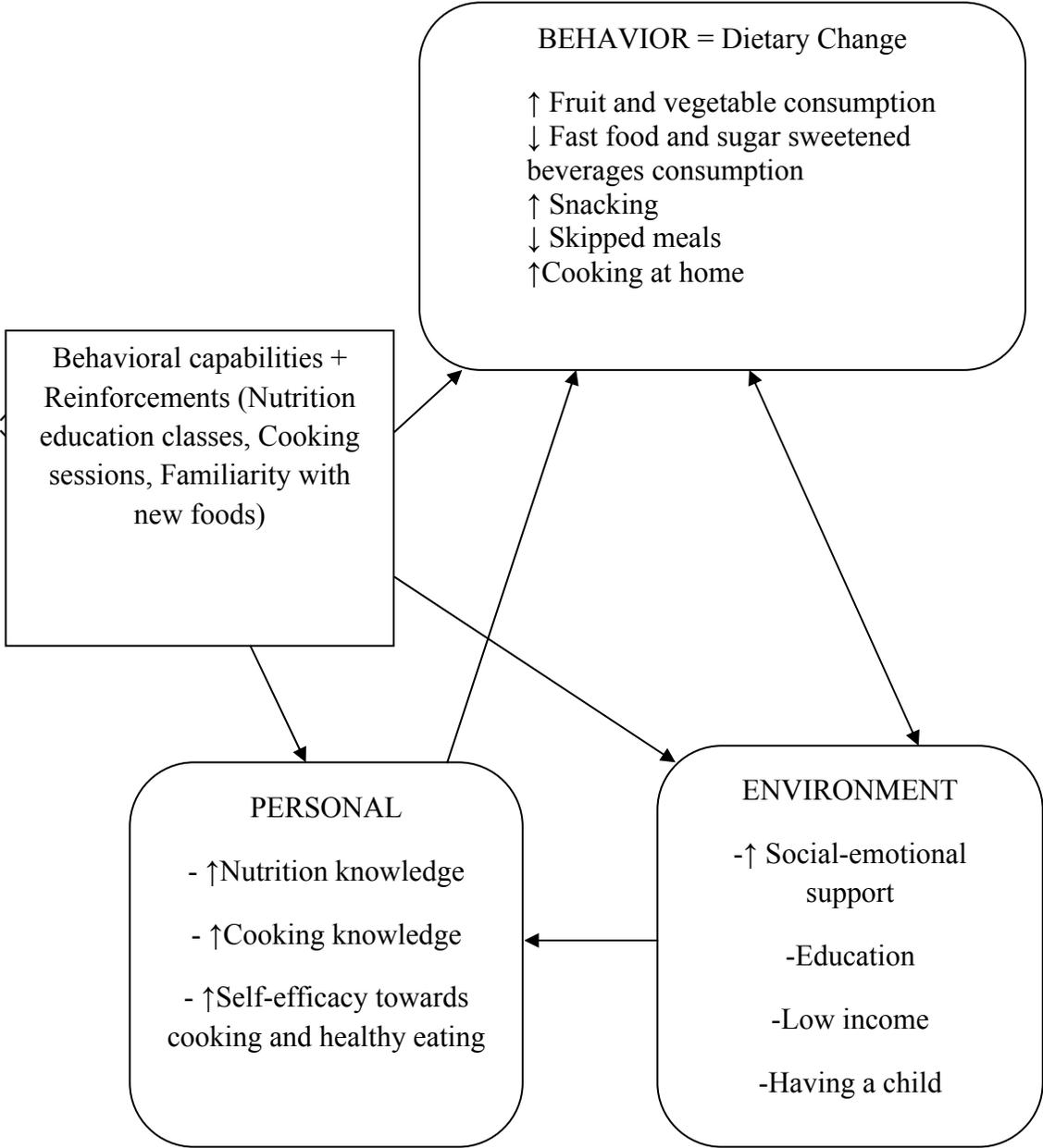


Table 5. Class topics and activities

Variable	Nutrition education topics	Class activity
Class 1	Safety in the Kitchen	Practice measuring dry and wet ingredients (flour, water, peanut butter)
Class 2	Fat	Taste testing to identify low-fat vs. regular fat products (yogurt, cheese, crackers)
Class 3	Food Labels and Managing your Food Dollar	Comparison of contents of two grocery bags to determine which bag holds cheaper products inside and why it is cheaper and reading food labels
Class 4	Portion Control	Determine food portion sizes by looking at food models
Class 5	My Pyramid	Quiz to determine if the food is either a fruit or vegetable
Class 6	Meal Planning	Quiz requiring the participant to circle the food that is healthier to eat
Class 7	Feeding your Child	Quiz regarding foods that are appropriate for children to eat at different life stages

Table 6. Demographic characteristics (mean \pm SD)

	Adolescent mothers (TPMP) ¹ N=8	Young adult mothers (HMHB) ² N=6
Average age (y)	17.6 \pm 1.1	21.7 \pm 2.4
Race		
African American	6 (75%)	5 (83%)
Hispanic	2 (25%)	0
Other	0	1 (17%)
Household size	4.8 \pm 3.0	2.5 \pm 1.4
Education level		
< 8 th grade	6 (75%)	0
High School	2 (25%)	4 (67%)
College	0	2 (33%)
Weight (pounds) ³	165.9 \pm 55.5	183.6 \pm 42.7
Height (inches) ⁴	62.0 \pm 2.6	53.9 \pm 24.0
Age of youngest child (months)	17.1 \pm 21.4	6.8 \pm 6.8
WIC enrollment ⁵	7 (88%)	4 (67%)
SNAP enrollment ⁶	3 (38%)	3 (50%)

¹ TPMP = Teen Parent Mentoring Program

² HMHB = Health Mom Healthy Babies Program

³ Self-reported value by each participant

⁴ Self-reported value by each participant

⁵ WIC = Special Supplemental Food Program Women, Infants, and Children

⁶ SNAP = Supplemental Nutrition Assistance Program

CHAPTER V

EPILOGUE

My collaboration with the YWCA first started in the 2008 spring semester during the graduate Nutrition Education class taught by Dr. Savoca. I worked with two other nutrition graduate students on a multidisciplinary project involving My Sister Susan's House. The nutrition students helped select the appropriate kitchen appliances and utensils for the house kitchen. After in-depth research was conducted on this topic, my team was able to suggest several appliances, kitchen utensils, and cabinets to be installed in My Sister Susan's House. I had the pleasure of going to the inauguration of this establishment and to see some of our ideas come to life.

The second project in collaboration with the YWCA involved a series of nutrition education and cooking classes. These classes were conducted in the spring of 2009 under the guidance of Dr. Savoca. Two graduate student and two undergraduate students helped design and conduct four nutrition education and cooking classes. Following each 15 minute educational session, the teens were split into groups and each group went with a nutrition student to cook the recipe assigned for that group. The classes were important for the teen mothers as they made an effort to come each week and be involved in them.

Last, I designed my dissertation project to include a series of seven nutrition education and cooking classes with two groups of mothers enrolled at the YWCA. This was a different project than I envisioned when I first started working with this idea.

Initially, there were going to be five nutrition education and cooking classes for 30 adolescent mothers enrolled in the Teen Parent Mentor Program (TPMP) at the YWCA of Greensboro and 20 mentors (10 mentors from YWCA and 10 mentors self-selected by the teenagers). Then, after consulting with the YWCA staff, we decided not to include the mentors in the study since we could not assure that they would consistently attend the class sessions. In making changes to the project, we decided to offer the nutrition intervention to adolescent mothers enrolled in the TPMP program and young adult mothers enrolled in the HMHB program. The nutrition education and cooking classes were incorporated into a program offered by the YWCA, Being Your Best Self, resulting in the expansion of classes from five to seven.

The YWCA staff was pivotal in the program design and implementation. I first started meeting with Mrs. Susan Cupito, the director of the Teen Parent Mentor Program, to discuss my ideas for the project and the feasibility of these ideas. I learned that having such a committed community partner helps improve the project. Not only did the YWCA staff have the vision for this intervention, but they helped shape it to become an attainable project. My project was designed as a program within a program (Being Your Best Self), for which the YWCA received funding in early 2011. The nutrition education classes and cooking sessions were part of the overall goals of improving increased knowledge, behaviors, and self-efficacy in preconception health for young mothers. They were also crucial in helping me to recruit the participants along with getting the mothers involved in the program. Every Tuesday afternoon the staff would leave early to pick-up mothers to help cook for the night. They planned their evening program around my nutrition

education component, to make sure that this piece was delivered as planned. They provided their kitchen space for the cooking component of the intervention. Also, they supplied the funding for the groceries used for the cooking portion of the program, along with shopping for groceries based on shopping lists created for each week's recipes. Everyone helped in trying to reach participants at the posttest and follow-up time point when I was unable to get in contact with some of the mothers. In sum, without the help of the YWCA this project would not have been possible. I admire them for all of their hard work and dedication to empower women all over Greensboro. In my opinion, without having a strong and dedicated community based partner, projects and interventions like this cannot be successfully implemented.

This project helped me to have more patience and to be open-minded. I like to work on a set schedule and have things follow the order they are supposed to be done. This project taught me that in some instances this is not the case. I had to learn to be patient when I would call participants to complete the 24-hour recall and the MPT questionnaire and they would not answer their phone, miss scheduled appointments, or not return my calls. I tried to place myself in their position and understand the difficulties they face in having to juggle school or work, a child, a large family, along with other issues (WIC or SNAP appointments). I might not be on their list of priorities, so I learned to be patient and try to call them the next day, and so on, until I did finally get in touch with them. Also, I learned to be open minded and spontaneous because again, things do not happen as planned. The best example of this happened during one of our first classes. Usually we would cook for 25-30 people at a time, and we would do

that using one oven only. With only 10 minutes to go until the food was supposed to be served, I and the students helping me cook realized that the chicken we were preparing that night was not going to be done in time. So we improvised on the spot: instead of cooking the chicken in baking dishes in the oven we turned the stove on and cooked the chicken faster in smaller pots. It did alter the aesthetics of the food, but we were able to serve dinner on time. This was important as each evening session had several presentations scheduled for the participants.

I learned new skills and improved others. I learned to conduct a Meal Pattern Timeline questionnaire with the help of Dr. Savoca to collect additional dietary information from the participants. I also conducted qualitative interviews with some of the YWCA mothers. These qualitative interviews helped me plan the script and the lesson plans for the intervention components of the dissertation project. It was also the first time I was able to teach a group of people. I have been a Graduate Assistant in the Nutrition Department since 2008 but did not get many opportunities to teach a class. This project allowed me this experience, even though it was an informal way of teaching. I found the informal setting at the YWCA to be challenging in the beginning, both because it was a new experience and also because the audience was skeptical of me. To them I was just a new person they did not know, so it took time for some participants to become comfortable with me. In the end they interacted more in the class, and even built up the courage to ask me questions. Last, I got the opportunity to improve my skills in conducting 24-hour recalls. I had some experience from my master's thesis project, but this allowed me more hands-on practice with a different group of women.

While the original project objectives included quantitative comparisons of learning outcome and food choice changes, the small sample size for the intervention component shifted the focus of the analysis to qualitative and formative research outcomes. The quantitative components (questionnaires and group comparisons) are included in Appendix.

Even though this was a small project, I thought this project was successful. I enjoy working with diverse populations and I was able to do just that with this intervention. Nobody should be looked down upon or judged their life events. I saw some positive changes being made at the YWCA after the cooking sessions ended. The YWCA staff continued to provide cooked meals to the mothers instead of returning to ordering pizza or subs. The staff is interested in providing nutritious and healthy meals to their participants, and I think this project helped them to get started on this path. Both the staff and I learned from one another, and I was lucky to have a community partner that was so interested in what I was doing and so supportive of it all. I also made new friends, including the staff and my participants. It has been both a joyful and stressful process, but in the end everyone involved in this project benefited from it.

Since these classes fit in well with the YWCA curricula, this collaboration should be continued. Separate programs should be developed for each of the two groups of mothers to target specific needs. With the adolescents, the programs should be designed to engage family members to cook and shop for healthier food options. For the young adult mothers, programs should focus more on how to feed their children healthier

options. Our participants were open to receiving advice on how to better their lives so I am sure they will continue to be receptive to new programs designed for them.

APPENDIX A
CONSENT FORMS FOR PRELIMINARY STUDY

The University of North Carolina at Greensboro

CONSENT TO ACT AS A HUMAN SUBJECT
(Long Form)

Project Title: Assessing nutrition knowledge and meal preparation skills of adolescent and older mothers participating in programs at the YWCA of Greensboro

Project Director: Martha Taylor, PhD, Associate Professor

Student Researchers: Ioana Scripa, MS, PhD student

Participant's Name: _____ Date of Consent: _____

What is the purpose of this interview? We would like to learn more about what affects the way you cook, how you eat, what you eat, and how you shop for your foods.

What are we asking you to do? You will be part of an one hour interview in which we will ask you about your eating habits, healthy eating, cooking and nutrition knowledge, and ways you shop at grocery stores. This interview will be audiotaped.

Where will my child be while I am being interviewed? The childcare services of the YWCA will be able to take care of your child while you are being interviewed.

Will I get any money from being part of this study? You will not receive any money for being part of the study, but we will provide you with a small gift.

Will the study hurt you in any way? The risk for participating in the study is minimal. We are going to ask you to answer a few questions regarding your eating habits, healthy eating, cooking and nutrition knowledge, and ways you shop at grocery stores. Because the interview is audiotaped, someone may recognize your voice. To minimize the risk to you, the tapes from the interviews will be stored in a locked file accessible only to the principal investigator and the student researcher.

Will anyone learn about my personal information? Your name will not be made public. You will be assigned an ID number for identification. The list that has the ID numbers and the names of the people in the study will be kept locked in Dr. Taylor's office and can only be seen by the people who are working on the study. The forms that you fill out will be kept in another place and locked as well. All the information in the files will be destroyed after five years by using a professional

shredder. There is a small risk that an unauthorized person could see your information. However, keeping the files locked and using ID numbers will reduce the chance of this happening.

Will the study help me in anyway? You will have a chance to better understand your eating style, your nutrition knowledge, the way you shop for groceries, and factors that influence these things in your life. Also, if you have any questions regarding this information we will try to clarify the issue for you.

Will the study help the society in anyway? The information you have provided us with will be used to create a nutrition education and cooking class program for mothers participating in the Teen Parent Mentor Program and Healthy Mothers, Healthy Babies at the YWCA.

Who has approved this study? The University of North Carolina at Greensboro Institutional Review Board has approved this study and this consent form.

Is there someone I can call if I have any questions? If you have any questions about being part of this study call Mr. Eric Allen at 336-256-1482. If you have questions about what will happen during the study contact Dr. Martha Taylor at 336-334-5313.

What does it mean if I sign this paper? Signing this paper means that you have read this paper and that you want to be in the study. If you don't want to be in the study, don't sign the paper. Remember, being in the study is up to you, and nothing will happen to you if you don't sign this paper.

What if I decide that I don't want to be part of the study? Nothing, you are allowed to withdraw from the study without penalty; just contact Dr. Taylor at 336-334-5313 and let her know.

I am at least 18 years old

____/____/____

Birthday

Signature of Participant who is 18 or older

Date

The University of North Carolina at Greensboro

ASSENT TO ACT AS A HUMAN SUBJECT
(Long Form)

Project Title: Assessing nutrition knowledge and meal preparation skills of adolescent and older mothers participating in programs at the YWCA of Greensboro

Project Director: Martha Taylor, PhD, Associate Professor

Student Researchers: Ioana Scripa, MS, PhD student

Participant's Name: _____ Date of Consent: _____

What is the purpose of this interview? We would like to learn more about what affects the way you cook, how you eat, what you eat, and how you shop for your food.

What are we asking you to do? You will be part of an one hour interview in which we will ask you about your eating habits, healthy eating, cooking and nutrition knowledge, and ways you shop at grocery stores. This interview will be audiotaped.

Did my parents say it was ok? Your parent/guardian said it was ok for you to be in this study and have signed a form like this one.

Where will my child be while I am being interviewed? The childcare services of the YWCA will be able to take care of your child while you are being interviewed.

Will I get any money from being part of this study? You will not receive any money for being part of the study, but we will provide you with a small gift.

Will the study hurt you in any way? The risk for participating in the study is minimal. We are going to ask you to answer a few questions regarding your eating habits, healthy eating, cooking and nutrition knowledge, and ways you shop at grocery stores. Because the interview is audiotaped, someone may recognize your voice. To minimize the risk to you, the tapes from the interviews will be stored in a locked file accessible only to the principal investigator and the student researcher.

Will anyone learn about my personal information? Your name will not be made public. You will be assigned an ID number for identification. The list that has the ID numbers and the names of the people in the study will be kept locked in Dr.

Taylor's office and can only be seen by the people who are working on the study. The forms that you fill out will be kept in another place and locked as well. All the information in the files will be destroyed after five years by using a professional shredder. There is a small risk that an unauthorized person could see your information. However, keeping the files locked and using ID numbers will reduce the chance of this happening.

Will the study help me in anyway? You will have a chance to better understand your eating style, your nutrition knowledge, the way you shop for groceries and factors that influence these things in your life. Also, if you have any questions regarding this information we will try to clarify the issue for you.

Will the study help the society in anyway? The information you have provided us with will be used to create a nutrition education and cooking class program for mothers participating in the Teen Parent Mentor Program and Healthy Mothers, Healthy Babies at the YWCA.

Who has approved this study? The University of North Carolina at Greensboro Institutional Review Board has approved this study and this consent form.

Is there someone I can call if I have any questions? If you have any questions about being part of this study call Mr. Eric Allen at 336-256-1482. If you have questions about what will happen during the study contact Dr. Martha Taylor at 336-334-5313.

What does it mean if I sign this paper? Signing this paper means that you have read this paper and that you want to be in the study. If you don't want to be in the study, don't sign the paper. Remember, being in the study is up to you, and nothing will happen to you if you don't sign this paper.

What if I decide that I don't want to be part of the study? Nothing, you are allowed to withdraw from the study without penalty; just contact Dr. Taylor at 336-334-5313 and let her know.

I am younger than 18 years old

Birthday ____/____/____

Signature of Participant who is younger than 18

Date

The University of North Carolina at Greensboro

CONSENT TO ACT AS A HUMAN SUBJECT FROM PARENT/GUARDIAN
(Long Form)

Project Title: Assessing nutrition knowledge and meal preparation skills of adolescent and older mothers participating in programs at the YWCA of Greensboro

Project Director: Martha Taylor, PhD, Associate Professor

Student Researchers: Ioana Scripa, MS, PhD student

Participant's Name: _____ Date of Consent: _____

What is the purpose of this study? We would like to learn more about what affects the way your child cooks, how she eats, what she eats, and how she shops for food.

What are you asking my child to do? Your child will be part of an one hour interview in which we will ask her about her eating habits, healthy eating, cooking and nutrition knowledge, and ways she shops at grocery stores. This interview will be audiotaped.

Where will my grandchild be while my child is being interviewed? The childcare services of the YWCA will be able to take care of your grandchild while your daughter is being interviewed.

Will my child get any money from being part of this study? Your child will not receive any money for being part of the study, but we will provide her with a small gift.

Will the study hurt my child in any way? The risk for your daughter participating in the study is minimal. We are going to ask your child to answer a few questions regarding her eating habits, healthy eating, cooking and nutrition knowledge, and ways she shops at grocery stores. Because the interview is audiotaped, someone may recognize your child's voice. To minimize the risk to her, the tapes from the interviews will be stored in a locked file accessible only to the principal investigator and the student researcher.

Will anyone learn about my child's personal information? Your child's name will not be made public. She will be assigned an ID number for identification. The list that has the ID numbers and the names of the people in the study will be kept locked in Dr. Taylor's office and can only be seen by the people who are working

on the study. The forms that your daughter fills out will be kept in another place and locked as well. All the information in the files will be destroyed after five years by using a professional shredder. There is a small risk that an unauthorized person could see your child's information. However, keeping the files locked and using ID numbers will reduce the chance of this happening.

Will the study help my child in anyway? Your child will have a chance to better understand her eating style, nutrition knowledge, the way she shops for groceries and factors that influence these things in her life. Also, if she has any questions regarding this information we will try to clarify the issue for her.

Will the study help the society in anyway? The information your child will provide us with will be used to create a nutrition education and cooking class program for mothers participating in the Teen Parent Mentor Program and Healthy Mothers, Healthy Babies at the YWCA.

Who has approved this study? The University of North Carolina at Greensboro Institutional Review Board has approved this study and this consent form.

Is there someone I can call if I have any questions? If you have any questions about your child being part of this study call Mr. Eric Allen at 336-256-1482. If you have questions about what will happen during the study contact Dr. Martha Taylor at 336-334-5313.

What does it mean if I sign this paper? Signing this paper means that you have read this paper and that you allow your child to be in the study. If you don't want your child to be in the study, don't sign the paper. Remember, letting your child participate in the study is up to you, and nothing will happen if you don't sign this paper.

What if I decide that I don't want my child to be part of the study? Nothing, she is allowed to withdraw from the study without penalty; just contact Dr. Taylor at 336-334-5313 and let her know.

By signing this form, you are affirming that you have read the information in the form and that you approve the participation of your child in this study.

Signature of Parent or Guardian

Date

APPENDIX B
CONSENT FORMS FOR MAIN STUDY

The University of North Carolina at Greensboro

CONSENT TO ACT AS A HUMAN SUBJECT
(Long Form)

Project Title: SELF-EFFICACY OF ADOLESCENT MOTHERS REGARDING
HEALTHY EATING AND MEAL PREPARATION

Project Director: Martha Taylor, PhD, Associate Professor

Student Researchers: Ioana Scripa, MS, PhD student

Participant's Name: _____ Date of Consent: _____

What is the purpose of the nutrition knowledge and cooking classes? We would like to learn more about what you know about nutrition, about cooking, and how confident you feel about shopping, cooking, and eating healthy, and what you are eating in general.

What are we asking you to do? You will be part of eight, one hour nutrition education and cooking classes. The classes will teach you about which foods are healthy and how to plan meals, read food labels, eat certain foods, cook foods, and be safe in the kitchen. We will ask you some questions about what you know about nutrition, what you know in terms of cooking, and how confident you feel about shopping, cooking, and eating healthy. We will ask you these questions before we begin the nutrition education and cooking classes, after we end the eight classes, and one-month after the end of the entire project. The classes will take place at the YWCA of Greensboro and will be part of the programs they offer. The total amount of time for your participation in this project is about 11 hours.

Where will my child be while I am being interviewed? The childcare services of the YWCA will be able to take care of your child while you are being interviewed.

Will I get any money from being part of this study? You will not receive any money for being part of the study, but we will provide you with a small gift.

Will the study hurt you in any way? The risk for participating in the study is minimal. There is always a chance that people can be injured in the kitchen but we will instruct you on how to do everything. The teachers will be there to make sure that you are careful when using knives or handling anything that is hot.

Will anyone learn about my personal information? Your name will not be made public. You will be assigned an ID number for identification. The list that has the

ID numbers and the names of the people in the study will be kept locked in Dr. Taylor's office and can only be seen by the people who are working on the study. The forms that you fill out will be kept in another place and locked as well. All the information in the files will be destroyed after five years by using a professional shredder. There is a small risk that an unauthorized person could see your information. However, keeping the files locked and using ID numbers will reduce the chance of this happening.

Will the study help me in anyway? You will have a chance to better understand your cooking knowledge, your nutrition knowledge and you confidence about shopping, cooking, and eating healthy, and your diet. If you have any questions regarding this information we will try to explain it to you more clearly.

Will the study help the society in anyway? This type of program helps adolescent and young adult mothers to be better prepared as individuals for the future. Your part in the project may help us show that classes like these should be more available to adolescents and young adults at the YWCA and in other places.

Who has approved this study? The University of North Carolina at Greensboro Institutional Review Board has approved this study and this consent form.

Is there someone I can call if I have any questions? If you have any questions about being part of this study call Mr. Eric Allen at 336-256-1482. If you have questions about what will happen during the study contact Dr. Martha Taylor at 336-334-5313.

What does it mean if I sign this paper? Signing this paper means that you have read this paper and that you want to be in the study. If you don't want to be in the study, don't sign the paper. Remember, being in the study is up to you, and nothing will happen to you if you don't sign this paper.

What if I decide that I don't want to be part of the study? Nothing, you are allowed to withdraw from the study without penalty or loss of services from the YWCA; just contact Dr. Taylor at 336-334-5313 and let her know.

I am at least 18 years old

Birthday ____/____/____

Signature of Participant who is 18 or older

Date

The University of North Carolina at Greensboro
ASSENT TO ACT AS A HUMAN SUBJECT
(Long Form)

Project Title: SELF-EFFICACY OF ADOLESCENT MOTHERS REGARDING
HEALTHY EATING AND MEAL PREPARATION

Project Director: Martha Taylor, PhD, Associate Professor

Student Researchers: Ioana Scripa, MS, PhD student

Participant's Name: _____ Date of Consent: _____

What is the purpose of the nutrition knowledge and cooking classes? We would like to learn more about what you know about nutrition, about cooking, and how confident you feel about shopping, cooking, and eating healthy, and what you are eating in general.

What are we asking you to do? You will be part of eight, one hour nutrition education and cooking classes. The classes will teach you about which foods are healthy and how to plan meals, read food labels, eat certain foods, cook foods, and be safe in the kitchen. We will ask you some questions about what you know about nutrition, what you know in terms of cooking, and how confident you feel about shopping, cooking, and eating healthy. We will ask you these questions before we begin the nutrition education and cooking classes, after we end the eight classes, and one-month after the end of the entire project. The classes will take place at the YWCA of Greensboro and will be part of the programs they offer. The total amount of the time for your participation in this project is about 11 hours.

Where will my child be while I am being interviewed? The childcare services of the YWCA will be able to take care of your child while you are being interviewed.

Will I get any money from being part of this study? You will not receive any money for being part of the study, but we will provide you with a small gift.

Will the study hurt you in any way? The risk for participating in the study is minimal. There is always a chance that people can be injured in the kitchen but we will instruct you on how to do everything. The teachers will be there to make sure that you are careful when using knives or handling anything that is hot.

Will anyone learn about my personal information? Your name will not be made public. You will be assigned an ID number for identification. The list that has the

ID numbers and the names of the people in the study will be kept locked in Dr. Taylor's office and can only be seen by the people who are working on the study. The forms that you fill out will be kept in another place and locked as well. All the information in the files will be destroyed after five years by using a professional shredder. There is a small risk that an unauthorized person could see your information. However, keeping the files locked and using ID numbers will reduce the chance of this happening.

Will the study help me in anyway? You will have a chance to better understand your cooking knowledge, your nutrition knowledge and you confidence about shopping, cooking, and eating healthy, and your diet. If you have any questions regarding this information we will try to explain it to you more clearly.

Will the study help the society in anyway? This type of program helps adolescent and young adult mothers to be better prepared as individuals for the future. Your part in the project may help us show that classes like these should be more available to adolescents and young adults at the YWCA and in other places.

Who has approved this study? The University of North Carolina at Greensboro Institutional Review Board has approved this study and this consent form.

Is there someone I can call if I have any questions? If you have any questions about being part of this study call Mr. Eric Allen at 336-256-1482. If you have questions about what will happen during the study contact Dr. Martha Taylor at 336-334-5313.

What does it mean if I sign this paper? Signing this paper means that you have read this paper and that you want to be in the study. If you don't want to be in the study, don't sign the paper. Remember, being in the study is up to you, and nothing will happen to you if you don't sign this paper.

What if I decide that I don't want to be part of the study? Nothing, you are allowed to withdraw from the study without penalty or loss of services from the YWCA; just contact Dr. Taylor at 336-334-5313 and let her know.

I am younger than 18 years old

Birthday ____/____/____

Signature of Participant who is younger than 18

Date

The University of North Carolina at Greensboro

CONSENT TO ACT AS A HUMAN SUBJECT FROM PARENT/GUARDIAN
(Long Form)

Project Title: SELF-EFFICACY OF ADOLESCENT MOTHERS REGARDING
HEALTHY EATING AND MEAL PREPARATION

Project Director: Martha Taylor, PhD, Associate Professor

Student Researchers: Ioana Scripa, MS, PhD student

Participant's Name: _____ Date of Consent: _____

What is the purpose of the nutrition knowledge and cooking classes? We would like to learn more about what your child knows about nutrition, about cooking, and how confident she feels about shopping, cooking, and eating healthy, and her diet in general.

What are we asking your daughter to do? Your child will be part of eight, one hour nutrition education and cooking classes. The classes will teach her about which foods are healthy and how she can plan meals, read food labels, eat certain foods, cook foods, and be safe in the kitchen. We will ask your child some questions about what she knows about nutrition, what she knows in terms of cooking, and how confident she feels about shopping, cooking, and eating healthy. We will ask her these questions before we begin the nutrition education and cooking classes, after we end the eight classes, and one-month after the end of the entire project. The classes will take place at the YWCA of Greensboro and will be part of the programs they offer. The total amount of time for her participation in this project is about 11 hours.

Where will my grandchild be while my daughter is being interviewed? The childcare services of the YWCA will be able to take care of your grandchild while your daughter is being interviewed.

Will my daughter get any money from being part of this study? Your child will not receive any money for being part of the study, but we will provide her with a small gift.

Will the study hurt your child in any way? The risk for participating in the study is minimal. There is always a chance that people can be injured in the kitchen but we will instruct your daughter on how to do everything. The teachers will be there to make sure that she is careful when using knives or handling anything that is hot.

Will anyone learn about my daughter's personal information? Your daughter's name will not be made public. She will be assigned an ID number for identification. The list that has the ID numbers and the names of the people in the study will be kept locked in Dr. Taylor's office and can only be seen by the people who are working on the study. The forms that your child fills out will be kept in another place and locked as well. All the information in the files will be destroyed after five years by using a professional shredder. There is a small risk that an unauthorized person could see your daughter's information. However, keeping the files locked and using ID numbers will reduce the chance of this happening.

Will the study help your child in anyway? Your daughter will have a chance to better understand her own cooking knowledge, nutrition knowledge and her confidence about shopping, cooking, and eating healthy, and her diet. If she has any questions regarding this information we will try to explain it to her more clearly.

Will the study help the society in anyway? This type of program helps adolescent and young adult mothers to be better prepared as individuals for the future. Your daughter's part in the project may help us show that classes like these should be more available to adolescents and young adults at the YWCA and in other places.

Who has approved this study? The University of North Carolina at Greensboro Institutional Review Board has approved this study and this consent form.

Is there someone I can call if I have any questions? If you have any questions about your daughter being part of this study call Mr. Eric Allen at 336-256-1482. If you have questions about what will happen during the study contact Dr. Martha Taylor at 336-334-5313.

What does it mean if I sign this paper? Signing this paper means that you have read this paper and that you allow your child to be in the study. If you don't want your child to be in the study, don't sign the paper. Remember, letting your child participate in the study is up to you, and nothing will happen if you don't sign this paper

What if I decide that I don't want my child to be part of the study? Nothing, she is allowed to withdraw from the study without penalty or loss of services from the YWCA; just contact Dr. Taylor at 336-334-5313 and let her know.

By signing this form, you are affirming that you have read the information in the form and that you approve the participation of your child in this study.

Signature of Parent or Guardian

Date

The University of North Carolina at Greensboro

CONSENT TO ACT AS A HUMAN SUBJECT
(Long Form)

Project Title: SELF-EFFICACY OF ADOLESCENT MOTHERS REGARDING
HEALTHY EATING AND MEAL PREPARATION

Project Director: Martha Taylor, PhD, Associate Professor

Student Researchers: Ioana Scripa, MS, PhD student

Participant's Name: _____ Date of Consent: _____

What is the purpose of the interview? We would like to learn what you think about the nutrition education and cooking sessions conducted from March to July 2011 at the YWCA facility.

What are we asking you to do? You will complete a questionnaire that will be sent to you by e-mail. This questionnaire contains 7 total questions asking your opinion about the classes and ways the sessions can be changed. The time it will take to complete this questionnaire is 30 minutes.

Will I get any money from being part of this study? You will not receive any money for being part of the study.

Will the study hurt you in any way? The risk for participating in the study is minimal. There are no personal questions being asked in this questionnaire. We just want your honest opinion of what you observed.

Will anyone learn about my personal information? No personal information will be collected from you so no one can identify the person that completed each questionnaire.

Will the study help me in anyway? You will give us a better chance to evaluate the intervention that took place at your facility and ways to improve these sessions to better achieve their aims.

Will the study help the society in anyway? By taking part in this interview you would help us improve these sessions which can help adolescent and young adult mothers to be better prepared as individuals for the future. Your part in the project may help us show that classes like these should be more available to adolescents and young adults at the YWCA and in other places.

Who has approved this study? The University of North Carolina at Greensboro Institutional Review Board has approved this study and this consent form.

Is there someone I can call if I have any questions? If you have any questions about being part of this study call Mr. Eric Allen at 336-256-1482. If you have questions about what will happen during the study contact Dr. Martha Taylor at 336-282-3305.

What does it mean if I sign this paper? Signing this paper means that you have read this paper and that you want to be of the interviews. If you don't want to be in the study, don't sign the paper. Remember, being in the study is up to you, and nothing will happen to you if you don't sign this paper.

What if I decide that I don't want to be part of the study? Nothing, you are allowed to withdraw from the study without penalty; just contact Dr. Taylor at 336-282-3305 and let her know.

I am at least 18 years old

____/____/____

Birthday

Signature of Participant who is 18 or older

Date

APPENDIX C

SUPPLEMENTARY TABLE 7

Table 7. Research Reporting Dietary Practices of Teenagers

Author	Age/ number of participants	Data Collection Timeline	Methods of data collection	Dietary intake findings
Cavadini et al. (2000)	11-18 years/ 12,498 teenagers	-1965 Nationwide Food Consumption Survey -1977-1978 Nationwide Food Consumption Survey -1989-1991 Continuing Survey of Food Intake by Individuals -1994-1996 Continuing Survey of Food Intake by Individuals	-24-hour recall - 2 self-administered 1-day food records	-Decrease energy, fats, and protein intake -Decreased consumption of vitamin A and Ca -Increase intake of vitamin C, iron, folate, and fiber

Cutler et al. (2009)	2,516 teenagers split in four groups: 1) young girls 2) young boys 3) older girls 4) older boys	- Time 1 - Time 2 (5 years later)	-Youth/ Adolescent semiquantitative food frequency questionnaire	- Four different dietary patterns emerged: vegetable pattern, fruit pattern, sweet/ salty snack food pattern, starchy food pattern -Young girls maintained these patterns at the 5 year follow-up - For older boys and girls, the fruit and vegetable pattern became combined into one separate pattern - A new dietary pattern, “fast-food”, appeared in the younger boys, and older boys and girls and contained foods such hamburgers, French Fries, fried foods, non-diet soda
Afenito et al. (2007)	9-10 years/ 2,379 girls	The girls were interviewed in 10 approximately annual study years	- Three-day food records	- White girls tended to consume greater amounts of micronutrients than the African-American girls with the exception of vitamins E, and C, and zinc -Decreased consumption of vitamin A, D, and C, calcium, and magnesium for all participants -Increase in consumption of vitamin E, B6, B12, and folate and zinc in white girls; stable pattern of consumption in African-American girls
Larson et al. (2007)	3,672 teenagers	- Project Eat-I (1998-1999) - Project Eat-II (2003-2004)	-Youth/ Adolescent semiquantitative food frequency questionnaire	- Significant reduction in daily consumption of fruits, vegetables, fruit, fruit juice, and French fries - For boys only, there was a significant decrease in consumption of dark/orange

				vegetables
Rampersaud et al. (2005)	Collection of 47 studies involving breakfast consumption of teenagers	Cross-sectional and longitudinal studies		<ul style="list-style-type: none"> - 59% of high school students skipped breakfast more than 3 times the previous week - Breakfast skippers consume less daily carbohydrates, protein, fat, saturated fat, fiber, vitamin A and C, riboflavin, calcium, zinc, and iron - Breakfast skippers tend to eat more high-fat snacks, French fries, and soft-drinks
Timlin et al. (2008)	2,222 teenagers	<ul style="list-style-type: none"> - Project Eat-I (1998-1999) - Project Eat-II (2003-2004) 	-Youth/ Adolescent semiquantitative food frequency questionnaire	<ul style="list-style-type: none"> - Girls were most likely to skip breakfast compared to boys - From Time 1 to Time 2, the percentage of boys who consumed breakfast declined by 16.8 %, - The frequency of eating breakfast was inversely associated with BMI in a dose-response
Afenito et al. (2005)	9-10 years/ 2,379 girls	The girls were interviewed in 10 approximately annual study years	- Three-day food records	<ul style="list-style-type: none"> - Caucasian girls reported a higher frequency of breakfast consumption than African-American girls - Skipping breakfast was associated with significantly lower intakes of calcium and fiber - Girls who consumed breakfast had a lower BMI
Nelson et al. (2002)	2,516 teenagers split in four groups: 1) young girls	<ul style="list-style-type: none"> - Project Eat-I (1998-1999) - Project Eat-II (2003-2004) 	-Youth/ Adolescent semiquantitative food frequency questionnaire	<ul style="list-style-type: none"> - In younger males, consumption of soda and sugar-sweetened beverages increased significantly - A significant decrease was seen among all adolescents in terms of consumption of fruit

	2) young boys 3) older girls 4) older boys			juice, milk, and other milk beverages - Older girls experienced a significant decrease in diet soda and other milk beverages
Nielsen et al. (2002)	12-18 years / survey one = 10,038 adolescents; survey two = 3,802 adolescents; survey three = 2,970 adolescents	- 1977-1978 Nationwide Food Consumption Survey - 1989-1991 Nationwide Food Consumption Survey - 1994-1996 Nationwide Food Consumption Survey	- 24-h recalls - 2 self-administered 1-day food records	- Mean total kcal intake increased significantly from the first to the third survey - An increase in salty snacks, candy, soft drinks, fruit drinks, alcohol, French fries, cheeseburgers, pizza, and Mexican food was also observed - The proportion of energy coming from restaurants/fast food increased over time
Papas et al. (2009)	109 primiparous, low-income African – American mothers and toddlers/	Longitudinal study (1997-1999)	-Toddler dietary intake- 73 item feeding check list -Mother dietary intake- Youth/ Adolescent Food Frequency Questionnaire	-For mothers, 34% reported consuming 5 servings of fruits and vegetables; if French fries were not included in this category, the figure dropped to 29% -Beverages consumed by the toddlers included cow's milk (75%), juice (94%), Kool-Aid (69%), and non-diet soda (61%) -Maternal consumption of fruit, vegetables, snacks, desserts, and soda was positively correlated with the dietary intake of the toddler of the same items ($p < 0.05$).
Di Noia and Contento (2009)	10 - 14 years/ 156 African-American adolescents	Cross-sectional study	-5 a Day Food Frequency Questionnaire -3-day direct observation	-67.1 % of the youth was consuming less than five a day servings of fruits and vegetables -Participants consumed more fruit and juice than vegetables

APPENDIX D

SUPPLEMENTARY TABLE 8

Table 8. Research Reporting Dietary Practices of Pregnant Teenagers

Author	Age/ number of participants	Data Collection Timeline	Methods of data collection	Dietary intake
Moran (2007)	13-20 years	Review paper including nine 1980-2006 cross sectional studies	-24 hour recall -Food records	- The mean nutrient intakes that most often fell below the DRI were energy, iron, folate, calcium, vitamin E, and magnesium
Giddens et al. (2000)	teenagers ages 13 to 18 years old and adult women 19 to 40 years old/ 59 adolescents and 97 adults	-Baseline - Third trimester of pregnancy	-Two 7- day food records	- Energy intake was below the recommended value of 2,500 kcal/day for both groups - Mean intakes of calcium, magnesium, zinc, iron, folate, fiber, and vitamins E and D were below the reference values for both groups. - Mean consumption of thiamin, niacin, riboflavin, and vitamin B-6, B-12, and A exceeded the recommended values for both groups - The adolescents had higher intakes of carbohydrates, fat, thiamin, riboflavin, niacin, folacin, iron, zinc, and vitamins A, B-6, and B-12 compared to the adults
Pobocik et al. (2003)	14-20 years old/ 434 pregnant adolescents divided into 3 groups:	Cross-sectional study	24- hour recall	- Energy intake of the participants was at 99% of the RDA - 78% of the population had calcium intake below 75% of the value of the AI - 80% of girls had mean intakes below the EAR for folate, vitamin E, and magnesium

	1) 14-15 years 2) 16-17 years 3) 18-20 years			- 63% of girls had iron intakes that were 75% below the RDA
Baker et al. (2009)	14-18 years/ 306 adolescents	Prospective study (2004-2007)	24 hour recall, obtained on 3 nonconsecutive days	- Adolescent smokers had lower concentrations of red blood cell folate, serum folate, and serum cobalamin - Adolescent with intakes of folate and iron that were below the lowest quartile were more likely to deliver SGA infants

APPENDIX E
PRELIMINARY STUDY QUESTIONNAIRE

Introduction to the Preliminary Study Interview for YWCA program mothers

Good evening. My name is _____. I am a student at UNCG in the department of Nutrition. I am working on a project whose purpose is to better understand personal, behavioral, and environmental factors related to the nutrition knowledge, cooking skills, and eating habits of teenage mothers and older mothers from the YWCA programs. I am here to talk with you about your eating habits, what you think of healthy eating, your nutrition knowledge and cooking skills. There are no right or wrong answers.

This interview should not last more than one hour. All of your information will be coded and your name will not be associated with it.

I will tape record our session to make sure that we are not missing any of the information you are giving us. I will also take some notes to help me remember our discussions. The tapes and notes will be destroyed after we have finished collecting and coding this information.

Do you have any questions so far?

If you don't feel comfortable answering a question, we can skip to the next one.

I want to thank you for your time spent with us and for helping with this project.

Are you ready to begin?

ID number _____

Date _____

BACKGROUND:

We are going to start the interview by asking you some questions about yourself to get to know you a little bit better.

Tell me a little bit about yourself-how old are you?
When is your birthday? (month, day, year)

Are in you school?
What grade?

Are you working?

IF YES: What do you do?
How many hours per week do you work?

Where do you live?
Do you live in an apartment or a house?

Who do you live with?

IF MORE PEOPLE LIVING TOGETHER: How many people live in your household?

How old is your child/ children?

Do you participate in any Food Assistance Programs?
IF YES: Name the programs in which you participate (WIC, SNAP (former Food Stamps), Food Banks/Church, Food Pantries, etc.)

Who shops/ purchases food in your household?

At which stores do you/household member purchase foods?

Why do you/household member shop at these particular stores?

How do you/household member get to these stores?

How do you shop once you are in the grocery store?

Do you use coupons from newspapers, grocery stores?

Who prepares foods eaten in the home?

MEAL CONSUMPTION

Now we are going to discuss about the meals you eat and where you eat them.

Do you sometimes eat at the homes of friends and neighbors?

IF YES:

How often to you eat at someone else's home?

What type of foods do they cook?

Do you have a garden?

IF YES: Do you grow any vegetables in your garden?

Do you get any foods from friends or family members who have gardens?

IF YES: What kind of foods do you get?

HEALTHY EATING

Now I am going to ask you a few questions about the topic of healthy eating

What is a healthy diet?

How would you describe a healthy diet?

Is eating healthy important to you?

IF YES: Briefly explain why eating healthy is important to you?

IF NOT: Briefly explain why eating healthy is not important to you?

How would you describe a diet that is not healthy?

How does your diet compare to what you describe as a healthy one?

What are some of the things that might keep you from eating healthy foods?

What could you do in order to change these things that prevent you from eating healthy foods/diets?

NUTRITION KNOWLEDGE

The next few questions will focus on nutrition knowledge.

Explain/define what nutrition is?

What areas of nutrition would you be interested in learning more about?

COOKING SKILLS

Now I am going to ask you some questions about your cooking skills

Do you cook?

IF NO: Why are you not cooking?

IF YES:

Do you like to cook?

How long have you been cooking food or meals?

Who taught you how to cook?

What kind of things do you usually cook?

How often do you cook?

Who does most of the cooking in your household?

Who prepares food for your child?

What cooking skills would you be interested in learning?

What types of foods would you be most interested in learning to cook?

Do you use any cookbooks?

IF YES: Why do you use cookbooks?

What are some of the cookbooks you use?
IF NO: Why don't you use cookbooks?

Do you have a favorite recipe?
IF YES: Which recipe is that?
How often do you prepare it?

Describe the kitchen in the home in which you live.

What cooking equipment do you have in your home?

Describe any things that make it hard for you to cook in your home.

Do you watch the Food Channel or other foods shows for getting new recipes to cook?
(What other food shows)

This concludes the first part of the interview. Next we are going to go into the Meal Patter Timeline for yourself and for your baby.

Those are all of the questions I have for today. Thank you so much for taking the time to do this interview with me today so I can understand the interests and needs of teen and older mothers from the YWCA programs.

APPENDIX F
QUESTIONNAIRES FOR INTERVENTION PROGRAM

ID number _____
Date _____

SOCIODEMOGRAPHIC QUESTIONNAIRE

Sociodemographics for adolescent mothers

1. Age: _____ years
2. Race: _____
3. Age of child: _____ months/ _____ years
3. How many years of school have you completed?
 1. \leq 8th grade
 2. 9th grade
 3. 10th grade
 4. 11th grade
 5. 12th grade
 6. > above high school
4. How many people live in your household? _____
5. WIC enrollment:
 - (0) No
 - (1) Yes
6. Are you enrolled in the Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program.
 - (0) No
 - (1) Yes

General Health

1. Height: _____ cm (+/- 0.1)
_____ cm (+/- 0.1) [Average: _____ cm]
2. Weight: _____ kg (+/- 0.1)
_____ kg (+/- 0.1) [Average: _____ kg]

ID number _____
Date _____

Cooking knowledge questionnaire

Circle the answer which you think is the best choice for the following questions:

1. Circle the right answer. Which of these two measurements is bigger?

$\frac{1}{2}$ cup

$\frac{3}{4}$ cup

2. How many fluid ounces are in one cup?

- a) 2 fluid ounces
- b) 4 fluid ounces
- c) 6 fluid ounces
- d) 8 fluid ounces

3. Circle the picture of what equipment you would use to drain pasta?



4. Salmonella, a bacteria that can be found in some foods and can cause diseases, can be found in which of the following foods?

- a) cookies
- b) apples
- c) poultry (chicken, turkey, goose)
- d) bread

5. Circle the right answer. Rings, bracelets and watches can contaminate food.

True

False

6. When a person washes their hands the right way, they first wet their hands and arms with hot water. Next, they scrub their hands for at least:

- a) 1 minute
- b) 5 minutes
- c) 20 seconds
- d) 40 seconds

7. Circle the right answer. What food would you cut first on a cutting board?

meat

vegetables

8. Circle the right answer. When a person measures liquids using a measuring cup, the liquid measuring cup should be placed on a flat even surface, such as a table, or counter, and then pour the liquid into it.

True

False

9. Circle the picture that is correct. Which kitchen tool would you use to measure flour?



10. What is the first thing you should do before you start cooking?

- a) wash hands
- b) get food out of the refrigerator
- c) wash dishes
- d) peel potatoes

11. Circle the right answer. The cooking process changes the flavor of food.

True

False

12. Mincing is also known as the process of:

- a) cutting foods into very small pieces
- b) boiling water
- c) greasing a pan
- d) washing fruits

13. Circle the picture that is correct. Which of these knives would you use to cut bread?



14. If you have one cutting board available in the house and you have just finished cutting meat on it and now you need to cut vegetables, what should you do?

- a) nothing, keep cutting the vegetables
- b) wash and sanitize the cutting board
- c) use a new knife
- d) throw away the cutting board

15. Circle the right answer. Which of these two measurements is bigger?

quart

gallon

16. The picture next to the question is that of a whisk.



What is a whisk used for?

- a) beating eggs
- b) washing fruit
- c) peeling vegetables
- d) cutting bread

17. Eggs and sugar can be mixed together and they create a foam. This process is also called:

- a) broiling
- b) braising
- c) whipping
- d) stir frying

18. When you are peeling a vegetable, you are:

- a) cutting the vegetable in small pieces
- b) removing the skin from the vegetables
- c) washing the vegetable
- d) roasting the vegetable

19. Circle the right answer. Which of these two measurements is bigger?

teaspoon

tablespoon

Number _____
Date _____

Nutrition Knowledge Questionnaire

Circle the answer you think is the best choice for the following questions:

1. What is one portion of raw vegetables?

- a) ½ cup
- b) 1 cup
- c) 2 cups
- d) 5 cups

2. Bread is known to have a high amount of this nutrient?

- a) carbohydrate
- b) calcium
- c) saturated fat
- d) sugar

3. Which food has the most fat in it?

- a) Hot dogs
- b) Turkey meat
- c) Bread
- d) Don't know

4. Butter is mostly made out of:

- a) Saturated fat
- b) Monounsaturated fat
- c) Polyunsaturated fat
- d) Trans fat

5. Trans fats are dangerous for the body because they:

- a) help you lose weight
- b) increase your fat levels in the blood
- c) cause dental cavities
- d) increase blood glucose levels

To answer questions 6, 7, 8, and 9 please use this picture of a food label

Nutrition Facts	
Serving Size 1 cup (228g)	
Serving Per Container 2	
Amount Per Serving	
Calories 250	Calories from Fat 110
% Daily Value*	
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 1.5g	
Cholesterol 30mg	10%
Sodium 450mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 3g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%
* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g

6. What is the serving size of this food?

- a) ½ cup
- b) 1 ounce
- c) 1 cup
- d) 10 grams

7. How many total calories does one serving of this food have?

- a) 0
- b) 100
- c) 250
- d) 1000

8. How many grams of total fat are in one serving of this food?

- a) 0 grams
- b) 12 grams
- c) 2 grams
- d) 100 grams

9. Does this food offer any dietary fiber?

- a) Yes
- b) No
- c) Don't know

10. Which of the following food has a high level of cholesterol?

- a) vegetables
- b) fruits
- c) meats
- d) grains

11. Whole grains are healthier to eat than refined grains because:

- a) they have more sugar
- b) they are cheaper to buy
- c) they have more dietary fiber
- d) they have less vitamins

12. Which vitamin is needed before and during pregnancy to prevent birth defects of the baby?

- a) Vitamin C
- b) Vitamin A
- c) Folic acid
- d) Niacin

13. What is the right serving size for milk or yogurt?

- a) ½ cup
- b) 1 cup
- c) 2 cups
- d) 5 cups

14. Which food is healthier?

- a) White bread
- b) Brown rice
- c) Candy
- d) Margarine

15. Which food has more fat in it?

- a) Frozen yogurt
- b) Ice cream
- c) Bread
- d) Don't know

16. Meat has a high amount of this nutrient:

- a) carbohydrate
- b) calcium
- c) protein
- d) vitamin and minerals

17. What is the right portion for rice or pasta?

- a) ½ cup
- b) 1 cup
- c) 2 cups
- d) 5 cups

18. Milk is considered to have a high amount of this nutrient?

- a) carbohydrate
- b) calcium
- c) saturated fat
- d) vitamin and minerals

19. Fruit is considered to have a high amount of this nutrient?

- a) fat
- b) calcium
- c) saturated fat
- d) fiber

20. What should you do to save money when you are shopping ?

- a) make a grocery list and follow the list when you are in the store
- b) don't shop when you are hungry
- c) go shopping only once a week
- d) all of the above

ID number _____

Date _____

Self-efficacy questionnaire

We want to know how confident you are in performing certain activities. For each of the questions, please write out or circle the answer that best applies to your own situation.

In your own words, define what “healthy eating” means to you:

I feel confident that I:	Not confident	A little confident	Somewhat confident	Highly confident	Extremely confident
a. Can read a food label	1	2	3	4	5
b. Understand a food label	1	2	3	4	5
c. Can shop for food all by myself	1	2	3	4	5
d. Can pick out a healthy food product from the shelves of the grocery store	1	2	3	4	5
e. Can save money when I go shopping for food	1	2	3	4	5
f. Can try eating new foods I have never tasted before	1	2	3	4	5
g. Can plan meals in advance	1	2	3	4	5
h. Can measure correctly the ingredients that are needed for a recipe	1	2	3	4	5

i. Can cook a whole recipe by myself	1	2	3	4	5
j. Can stop germs from getting in my foods when I am cooking	1	2	3	4	5
k. Can cut-up fruits and vegetables by myself	1	2	3	4	5
l. Am eating healthy meals	1	2	3	4	5
m. Can eat more home cooked meals instead of eating out	1	2	3	4	5
n. Am eating the right portions of foods	1	2	3	4	5
o. Am eating the right amount of vegetables for my age group.	1	2	3	4	5
p. Am eating the right amount of fruits for my age group	1	2	3	4	5
q. Can limit the amount of high sugar foods that I am eating	1	2	3	4	5
r. Can limit the amount of fast-food that I am eating	1	2	3	4	5
s. Can include more fiber in my diet	1	2	3	4	5
t. Can resist eating in front of the TV	1	2	3	4	5

Evaluation Survey

We would like to know your honest opinion of the Nutrition Education and Cooking classes. Your comments are confidential and will be used to make changes for future classes. The questions are rated on a scale from 1 to 5 where 1 means “not at all helpful” and 5 means “very helpful”.

How helpful were the CLASSES:	1 (Not at all)	2	3	4	5 (Very)	Did not attend/ receive item
a. Class topics in general	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
b. Class 1 – Safety in the Kitchen	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
c. Class 2 – Fat	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
d. Class 3 – Food Labels and Managing your Food Dollar	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
e. Class 4 – Portion Control	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
f. Class 5 – My Pyramid	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
g. Class 6 – Meal Planning	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
h. Class 7—Feeding your Child	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
i. Recipes from classes	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
j. Handouts from classes	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
k. Cooking classes	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

How helpful did you find the following INFORMATION from the classes:	1 (Not at all)	2	3	4	5 (Very)	Did not use/read
l. • Session 1- Learned about foodborne illnesses and what causes them • Talked about prevention of cross-contamination of food • Went over the proper technique for handwashing	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
m. • Session 2- Learned about healthy eating • Talked about the different types of fats, and foods that have high, medium, and low levels of fat in them.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
n. • Session 3- Learned how to read a food label • Discussed budgeting, how to shop on a budget, tips for staying within your budget, and how to eat healthy on a budget.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
o. • Session 4- Discussed portion sizes, how to determine them and how they've become distorted over the past two decades.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
p. • Session 5- Learned about the My Pyramid Website. • Went over some tips on how to consume more whole grains, fruits, vegetables, calcium rich foods, and folate.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
q. • Session 6- Learned why it is important to build better meals and snacks. • Talked about the ways to make a traditional breakfast, lunch, and snacks healthier • Talked about better fast food options for breakfast and lunch.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
r. • Session 7- Learned ways to feed your children healthy foods • Talked about what you should or you should not feed your children • Went over some menus for young children	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

How helpful did you find the following RECIPES from the classes:	1 (Not at all)	2	3	4	5 (Very)	Did not use/read
s. Recipes from class 1 <ul style="list-style-type: none"> • Chicken Stroganoff • Whole wheat pasta • Broccoli and cheese • Apples with yogurt sauce 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
t. Recipes from class 2 <ul style="list-style-type: none"> • Barbeque chicken • Cole slaw • Potato salad • Vinaigrette dressing • Mayo dressing • Fruit pizza 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
u. Recipes from class 3 <ul style="list-style-type: none"> • Chicken salad • Tuna salad • Butter glazed carrots • Peach Ginger crumble 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
v. Recipe from class 4 <ul style="list-style-type: none"> • Chicken quesadilla • Black bean and corn salsa • Lemon cookies 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
w. Recipe from class 5 <ul style="list-style-type: none"> • Whole wheat pasta with red sauce, vegetables, and ground turkey • Garlic bread • Green salad • Fruit salad 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
x. Recipe from class 6 <ul style="list-style-type: none"> • Chicken teriyaki stir fry • Brown rice • Berry crisp 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
y. Recipes for class 7 <ul style="list-style-type: none"> • Pasta primavera • Green salad • Fruit salad 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

z. Did the recipes motivate you to attend class?	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
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How often have you prepared the recipes at home:	1 (Not at all)	2	3	4	5 (Very)	Did not use/read
aa. Recipe from class 1	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
bb. Recipe from class 2	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
cc. Recipe from class 3	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
dd. Recipe from class 4	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
ee. Recipe from class 5	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
ff. Recipe from class 6	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
gg. Recipe from class 7	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

How helpful were the TOOLS RECEIVED:	1 (Not at all)	2	3	4	5 (Very)	Did not use/read
hh. Cooking utensils received after completing the questionnaires for the first time (measuring cups, measuring spoons, liquid measuring cups, hot pads)	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
ii. Handouts offered at each class	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
jj. Did the gifts motivate you to attend class?	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
kk. Did having child care help your attendance?	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

How helpful were the ACTIVITIES performed during each class:	1 (Not at all)	2	3	4	5 (Very)	Did not use/read
ll. Activity from class 1- Practice measuring ingredients	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
mm. Activity from class 2- Taste testing	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
nn. Activity from class 3- Comparison of the two grocery bags to determine which is cheaper and why it is cheaper	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
oo. Activity from class 4- Determine the portion sizes by looking at food models	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

ww. On a scale from 1 – 10, how likely is it that this study improved your healthy eating?									
1	2	3	4	5	6	7	8	9	10
Not at all								Very much so	
xx. On a scale from 1 – 10, how likely is it that this study improved your child's healthy eating?									
1	2	3	4	5	6	7	8	9	10
Not at all								Very much so	

yy. How many times a week do you cook?

- ₁ None
- ₂ More often than never, but less than once a week
- ₃ 1 time a week
- ₄ 2 times a week
- ₅ 3 times a week
- ₆ 4 times a week
- ₇ 5 or more times a week

zz. Which meals do you prepare? (check all that apply to you)

- ₁ Breakfast
- ₂ Lunch
- ₃ Dinner
- ₄ Snacks

aaa. How many times a week do you grocery shop?

- ₁ None
- ₂ More often than never, but less than once a week
- ₃ 1 time a week
- ₄ 2 times a week
- ₅ 3 times a week
- ₆ 4 times a week
- ₇ 5 or more times a week

bbb. How often have you read the handouts that were presented to you each week at the beginning of the classes?

- ₁ Never
- ₃ 1 time a week
- ₄ 2 times a week
- ₅ 1 time per month

ccc. Describe what barriers have prevented you from attending the nutrition education and cooking classes.

ddd. Describe any barriers that prevented you from understanding the materials and the handouts presented to you.

eee. Describe any barriers that prevent you from cooking in your home.

Follow-up Survey

We would like to know what materials and information you are still using after the end of the Nutrition Education and Cooking classes. Your comments are confidential. The questions are rated on a scale from 1 to 5 where 1 means “rarely using” and 5 means “using very often”

Are you still using the handouts from the CLASSES:	1 (Rarely)	2	3	4	5 (Very)	Not using/reading
uu. Class 1 – Safety in the Kitchen	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
vv. Class 2 – Fat	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
ww. Class 3 – Food Labels and Managing your Food Dollar	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
xx. Class 4 – Portion Control	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
yy. Class 5 – My Pyramid	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
zz. Class 6 – Meal Planning	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
aaa. Class 7—Feeding your Child	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

Are you still using the following RECIPES from the classes:	1 (Rarely)	2	3	4	5 (Very)	Not using/reading
bbb. Recipes from class 1 <ul style="list-style-type: none"> • Chicken Stroganoff • Whole wheat pasta • Broccoli and cheese • Apples with yogurt sauce 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
ccc. Recipes from class 2 <ul style="list-style-type: none"> • Barbeque chicken • Cole slaw • Potato salad • Vinaigrette dressing • Mayo dressing • Fruit pizza 	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

ddd. Recipes from class 3 <ul style="list-style-type: none"> • Chicken salad • Tuna salad • Butter glazed carrots • Peach Ginger crumble 	<input type="checkbox"/>					
eee. Recipe from class 4 <ul style="list-style-type: none"> • Chicken quesadilla • Black bean and corn salsa • Lemon cookies 	<input type="checkbox"/>					
fff. Recipe from class 5 <ul style="list-style-type: none"> • Whole wheat pasta with red sauce, vegetables, and ground turkey • Garlic bread • Green salad • Fruit salad 	<input type="checkbox"/>					
ggg. Recipe from class 6 <ul style="list-style-type: none"> • Chicken teriyaki stir fry • Brown rice • Berry crisp 	<input type="checkbox"/>					
hhh. Recipes for class 7 <ul style="list-style-type: none"> • Pasta primavera • Green salad • Fruit salad 	<input type="checkbox"/>					

How often do you prepared the recipes at home:	1 (Rarely)	2	3	4	5 (Very)	Did not use/read
iii. Recipe from class 1	<input type="checkbox"/>					
jjj. Recipe from class 2	<input type="checkbox"/>					
kkk. Recipe from class 3	<input type="checkbox"/>					
lll. Recipe from class 4	<input type="checkbox"/>					
mmm. Recipe from class 5	<input type="checkbox"/>					
nnn. Recipe from class 6	<input type="checkbox"/>					
ooo. Recipe from class 7	<input type="checkbox"/>					

Are you using the TOOLS RECEIVED:	1 (Rarely)	2	3	4	5 (Very)	Did not use/read
ppp. Cooking utensils received after completing the questionnaires for the first time (measuring cups, measuring spoons, liquid measuring cups, hot pads, cookbook)	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆
qqq. Handouts offered at each class	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆

kk. How many times a day do you cook?

- ₁ None
- ₂ More often than never, but less than once a week
- ₃ 1 time a week
- ₄ 2 times a week
- ₅ 3 times a week
- ₆ 4 times a week
- ₇ 5 or more times a week

kk. Which meals do you cook? (Check all that apply)

- ₁ Breakfast
- ₂ Lunch
- ₃ Dinner
- ₄ Snacks

kk. How many times a week do you grocery shop?

- ₁ None
- ₂ More often than never, but less than once a week
- ₃ 1 time a week
- ₄ 2 times a week
- ₅ 3 times a week
- ₆ 4 times a week
- ₇ 5 or more times a week

YWCA Staff Survey

Good afternoon. I am here to get your general opinion about the nutrition education and cooking sessions conducted from March to July 2011 at your YWCA facility. Your answers to these questions will help us evaluate the program as it was conducted and also how this program can be improved for future use.

1. What did you think about the program in general?
2. What about this program do you think worked best for the adolescent and young mothers participating in the YWCA life-skills programs?
3. What about this program do you think was less effective for the adolescent and young mothers participating in the YWCA life-skills programs?
4. Did this program fit in with overall goals of life-skill programs?
5. What type of general feedback did you receive from the participants enrolled in the nutrition education and cooking sessions regarding this intervention?
6. Could you foresee a continuation of this program at the YWCA?
 - a. Why or why not?
7. Is there anything you would like to change about the intervention for future use?

Thank you for your time and for your participation in this survey.

APPENDIX G

SUPPLEMENTARY TABLE 9

Table 9. Nutrition Knowledge, Cooking Knowledge, and Self-Efficacy scores at pretest, posttest, and follow-up time points (mean ± SE)		
	Young adult (HMHB) mothers ¹	Adolescent (TPMP) mothers ²
	N=6	N=8
Baseline scores		
Nutrition knowledge	15.00 ± 0.63	14.38 ± 0.84
Cooking knowledge	16.83 ± 0.17	14.00 ± 0.73
Self-efficacy	66.50 ± 2.81	70.75 ± 8.15
Post-test scores		
Nutrition knowledge	16.83 ± 0.54	15.25 ± 0.70
Cooking knowledge	16.33 ± 0.50	15.50 ± 0.60
Self-efficacy	74.50 ± 8.63	78.50 ± 6.28
Follow-up scores		
Nutrition knowledge	16.17 ± 0.98	15.75 ± 0.75
Cooking knowledge	17.50 ± 0.22	16.50 ± 0.57
Self-efficacy	77.67 ± 4.98	80.63 ± 7.03

¹ HMHB= Healthy Mom Healthy Babies program at YWCA, Greensboro, NC

² TPMP = Teen Parent Mentoring Program at the YWCA, Greensboro, NC

APPENDIX H

SUPPLEMENTARY TABLE 10

Table 10. Dietary intake from 24 hour recall based on 1000 kcal (mean ± SE)

	HMHB ¹	TPMP ²	HMHB	TPMP	HMHB	TPMP
	N=6	N=7	N=6	N=7	N=6	N=7
	Baseline scores		Post-test scores		Follow-up scores	
Calories	1401.3 ± 179.4	2168.8 ± 410.3	1589.2 ± 301.2	1719.2 ± 272.4	1270.3 ± 119.1	1909.4 ± 435.0
Calorie ranges	834.7 - 1978.6	764.0 - 4283.1	556.8 - 2394.9	457.5 - 2870.9	996.2 - 1761.8	151.0 - 3802.3
Fat (g) ³	32.4 ± 2.3	39.5 ± 3.4	41.6 ± 3.0	49.0 ± 4.0	41.5 ± 3.7	40.0 ± 2.6
Carbohydrates (g) ⁴	137.1 ± 6.9	118.8 ± 9.0	123.4 ± 9.0	104.9 ± 9.6	120.6 ± 10.1	124.7 ± 11.5
Protein (g) ⁵	42.2 ± 6.06	44.7 ± 5.9	36.0 ± 5.6	36.9 ± 4.1	38.5 ± 8.9	37.2 ± 5.2
Saturated fat (g) ⁶	11.7 ± 1.6	13.7 ± 1.4	16.0 ± 1.5	16.9 ± 2.9	13.7 ± 1.4	12.9 ± 2.0
Monounsaturated fat (g) ⁷	10.6 ± 1.1	13.7 ± 1.2	14.2 ± 1.4	16.3 ± 1.3	16.7 ± 2.2	12.9 ± 1.3
Polyunsaturated fat (g) ⁸	8.2 ± 2.3	9.0 ± 1.5	7.8 ± 1.5	11.8 ± 2.1	7.1 ± 1.2	10.1 ± 1.3

173

¹ HMHB= Healthy Mom Healthy Babies program at YWCA, Greensboro, NC

² TPMP= Teen Parent Mentoring Program at YWCA, Greensboro, NC

³ Grams of fat based on calculated nutrient consumption normalized to 1000 calories

⁴ Gram of carbohydrate based on calculated nutrient consumption normalized to 1000 calories

⁵ Grams of protein based on calculated nutrient consumption normalized to 1000 calories

⁶ Grams of saturated fat based on calculated nutrient consumption normalized to 1000 calories

⁷ Grams of monounsaturated fat based on calculated nutrient consumption normalized to 1000 calories

⁸ Grams of polyunsaturated fat based on calculated nutrient consumption normalized to 1000 calories