COMMUNITY-ACADEMIC PARTNERSHIPS: CAN AFTER-SCHOOL AND SCHOOL-BASED PROGRAMS IMPROVE DIETARY AND PHYSICAL ACTIVITY PATTERNS OF YOUTH IN GEORGIA?

by

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(Under the Direction of Rebecca M. Mullis)

ABSTRACT

This study evaluated an after-school and a school-based program aimed at improving the dietary and physical activity patterns of youth in Georgia. Both programs utilized community-academic partnerships and community-based participatory research (CBPR) methods. Participants self-reported dietary and physical activity patterns pre- and post-intervention. Researchers measured height and weight of the after-school program participants pre- and post-intervention. No significant changes in dietary or physical activity patterns were reported for participants of the after-school program. Additionally, there were no significant changes in BMI. Site was significantly associated with behaviors, with site 3 consuming significantly more fruits, vegetables, healthy and unhealthy foods. Site 3 also reported participating in significantly more physical and sedentary activities. BMI was significantly negatively associated with consumption of fruits, vegetables and healthy foods as well as participation in physical activities. Age was significantly positively associated with being sedentary.

The school-based program targeted both students and their parents. Students reported a significant increase in physical activity at school and a significant decrease in screen time. Students also reported a significant decrease in consumption of fruits. Female participants reported consuming significantly more fruit and participating in significantly fewer hours of screen time. Participants from school 2 consumed significantly more fruits and vegetables, but scored significantly lower for physical activity knowledge. Participants from school 3 scored significantly higher for nutrition knowledge, but reported participating in significantly less physical activity at school. Finally, participants from school 5 scored significantly higher for physical activity knowledge. Parents reported participating in significantly more physical activity overall and with their child/children. Parents also reported that their children participated in significantly more physical activity both at school and outside of school. There were significant increases in the reported frequency of reading nutrition labels and the number of nutrients parents considered when purchasing a food item.

Findings from this study suggest that after-school programs can improve the dietary and physical activity patterns of youth. School-based programs can influence behaviors and knowledge of both students and parents. Community-academic partnerships and CBPR are viable means of creating and implementing effective nutrition and physical activity interventions targeting youth and their parents.

INDEX WORDS: Nutrition, Community-based participatory research, Evaluation, After-school, School-based, Community-academic partnership, Physical Activity

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by

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A Dissertation Submitted to the Faculty of the University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GA

2011

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DEDICATION

I would like to dedicate this dissertation to my parents, Tim and Harriet Seaver, who have always believed in me and supported my academic endeavors. Thank you for not allowing me to drop out of kindergarten.

ACKNOWLEDGEMENTS

First and foremost I would like to thank Dr. Rebecca Mullis for all of her support and guidance throughout my time at the University of Georgia. You have taught me so much and I never would have made it through this process without your wisdom and experience. Dr. James Bason, I cannot thank you enough for your help with my statistics. Thank you for always making time to answer my questions and for your patience. Drs Davis, Hanula and Lewis, thank you for your support and encouragement. Your commitment to education and research that truly benefits the community is inspiring.

Yotin Srivanharean and Amanda Luong of CPACS, thank you for your all your hard work and dedication to the program. Thank you for welcoming me into your community, I learned so much from you. I have such respect for you and the work you do to better your community. I must also thank Christie Kay, Suzanne Glenn and Kendall Wall of HealthMPowers for their efforts. I gained invaluable experiences working in the school systems that will be a great attribute to my future career.

I must give a special thank you to Tonya Dalton and Sharon Hanson for all of your help with the administrative side of this project. You both went above and beyond in the support you provided me. Last, but certainly not least, I would like to thank all of my friends and fellow students for your encouragement and kind words.

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CHAPTER 1

INTRODUCTION

Purpose

Two studies were conducted to evaluate the effectiveness of community-based nutrition and physical activity interventions targeting youth in Georgia. Both studies utilized community-based participatory research (CBPR), which required the formation of community-academic partnerships between local community organizations and the Foods and Nutrition Department of the University of Georgia. One study targeted youth from immigrant and refugee families through an after-school program, while the other targeted youth and their families through a school-based program. The epidemic of childhood overweight and obesity is multi-factorial, making it necessary to target not only the individual, but the community as well. Both after-school and school-based programs offer distinct advantages depending on the target audience and the overall goals of the program. The purposes of these studies were to form community-academic partnerships and to assess the effectiveness of two nutrition and physical activity interventions implemented by community organizations.

Rationale and Significance

One-third of children in the United States are overweight or obese, with the prevalence in Georgia being higher than the national average (Hedley et al 2004). It is well established that both diet and physical activity play important roles in overweight and obesity. Overweight and obese children are at increased risk for type 2 diabetes, asthma, sleep apnea, early maturation,

hypertension, hyperlipidemia and psychosocial consequences (Benjamin et al 2007; Eisenberg et al 2003; Strauss et al 2003). Such diseases are costly both in terms of direct medical costs as well as decreased quality of life (Schwimmer et al 2003). Overweight and obesity along with comorbidities that develop during adolescence are likely to continue into adulthood (Wisemandle et al 2000).

The current epidemic of childhood overweight and obesity is markedly increasing obesity-related disorders in children and is multifactorial, making it necessary to target not only the child, but the community. Studies have shown that community-based interventions, particularly after-school and school-based programs, can improve dietary and physical activity behaviors of youth (Casazza and Ciccazzo 2007; Ciliska et al 2000; Howerton et al 2007). However, there is a distinct lack of research focusing on youth from immigrant and refugee families (youth born in a country other than the U.S. or youth who are first generation U.S. born) and youth of ethnic minority. These are important groups to target as dietary acculturation can lead to increased risk of overweight and obesity along with chronic disease (Van Hook and Balistreri 2007; Yang et al 2007). Additionally, individuals of ethnic minority are at increased risk of overweight and obesity along with most common chronic diseases (Centers for Disease Control and Prevention 2011; Van Hook and Balistreri 2007; Yang et al 2007). Thus, these two studies will increase our knowledge of the effectiveness of community-based interventions targeting youth and in particular, youth of ethnic/racial minorities. Results of these studies may also aid in the formation and implementation of future community-academic partnerships that can improve diet and physical activity behaviors of youth.

Specific Aims

1) Form community-academic partnerships with the Center for Pan Asian Community Services (CPACS) and HealthMPowers.
2) Evaluate the effectiveness of an after-school nutrition and physical activity intervention, implemented by a community organization, with respect to increasing consumption of more healthy foods, decreasing consumption of less healthy foods and increasing participation in physical activity.
3) Evaluate the effectiveness of a school-based nutrition and physical activity intervention, implemented by a community organization, with respect to increasing consumption of more healthy foods, decreasing consumption of less healthy foods and increasing participation in physical activity.

Hypotheses

1) An after-school nutrition and physical activity intervention implemented by a community organization will increase consumption of more healthy foods, decrease consumption of less healthy foods and increase participation in physical activity.
2) A school-based nutrition and physical activity intervention implemented by a community organization will increase consumption of more healthy foods, decrease consumption of less healthy foods and increase participation in physical activity.

Organization of this Document

Chapter Two is a literature review of nutrition and physical activity interventions targeting childhood overweight and obesity in the United States. Community-academic partnerships and

CBPR are relatively new research methods. Thus, interventions utilizing these techniques will be the focus for this literature review. Advantages and disadvantages of both after-school and school-based interventions will also be presented. Finally, childhood overweight and obesity among ethnic/racial minorities will be discussed.

Chapters Three and Four are manuscript style chapters in which the methods and results of the community-organization specific evaluations are presented. Chapter Three presents the evaluation of the after-school program implemented with CPACS. In this chapter dietary and physical activity behaviors are compared pre-, immediate post- and 6-months post-intervention. Chapter Four presents the evaluation of the school-based program implemented with HealthMPowers. In this chapter dietary and physical activity behaviors and knowledge are compared pre- and post-intervention. The intervention implemented by HealthMPowers targeted both the student and their parent. Therefore, data is presented for students and parents. In Chapter Five, conclusions from the two evaluations along with recommendations for future research are discussed.

CHAPTER 2

LITERATURE REVIEW

Childhood Obesity

Over the last three decades the prevalence of childhood obesity has increased more than threefold (Singh et al 2008). One-third of children in the United States are overweight or obese, with the rate in Georgia even higher than the national average (Hedley et al 2004). The rise in obesity has occured due to an interplay of genetics, behavioral responses and environmental factors (Selassie and Singh 2011). Childhood overweight and obesity is defined according to Body Mass Index (BMI). However, unlike adults, BMI for children (aged 2-19 years) is converted to a percentile according to the age and sex specific growth charts published by the Centers for Disease Control and Prevention (CDC) in 2000. Children at or above the 85th percentile, but below the 95th percentile, are classified as overweight and those at or above the 95th percentile are considered obese (Centers for Disease Control 2010).

While individuals cannot control their genetic make-up there are lifestyle choices that can reduce the risk of overweight and obesity. It is well accepted that both diet and physical activity play important roles in overweight and obesity. However, many children do not consume a healthy diet or participate in the recommended 60 minutes of physical activity per day (Centers for Disease Control 2009). According to data from the Youth Behavioral Risk Factor Surveillance System (YRBSS), 2009, only 22.3% of adolescents are eating the recommended amounts of fruits and vegetables. Additionally, less than 15% of adolescents are drinking the recommended 3 glasses of milk per day and nearly 30% are drinking at least 1 soda per day

(Centers for Disease Control 2009). YRBSS also reported that only 18.4% of adolescents are engaging in the recommended 60 minutes of physical activity per day. As modifiable risk factors, it is important to address these behaviors if we are going to impact childhood overweight and obesity.

There are many adverse health consequences associated with overweight and obesity that can begin to develop even in children. Overweight and obese children are at higher risk for type 2 diabetes, asthma, sleep apnea, early maturation, hypertension, hyperlipidemia and psychosocial consequences (Benjamin et al 2007; Ebbeling et al 2002; Eisenberg et al 2003; Strauss et al 2003). Overweight has been found to decrease performance in school in several ways, such as health related absenteeism (Story et al 2006). Students who are overweight or obese are often bullied, express feelings of loneliness and low self-esteem, all of which can affect scholastic achievement (Story et al 2006). Many of the chronic diseases linked to overweight and obesity are associated with increased age, but recently, increases in the presence of risk factors as well as the prevalence of many of these diseases in youth have been seen (Benjamin et al 2007; Centers for Disease Control 2010). For example, a study conducted by Freedman et al (2007) found that 70% of obese children had at least one risk factor for cardiovascular disease and 39% had two or more. This is alarming as heart disease is the number one cause of death among both men and women in the U.S. (Centers for Disease Control 2010). Additionally, the CDC predicts that one in three individuals who were born in 2000 will go on to develop type 2 diabetes, another major risk factor for the development of heart disease (Narayan et al 2003). Diseases associated with overweight and obesity are expensive both in terms of direct medical costs as well as decreased quality of life (Schwimmer et al 2003). Including medical care, medications and lost productivity, heart disease alone will the U.S. $316.4 billion in 2010 (Centers for Disease

Control 2010). Overweight and obesity, along with any associated health consequences, that develop during adolescence are likely to continue into adulthood (Reilly 2005; Weiss and Caprio 2005; Wisemandle et al 2000). These complications are often more common among ethnic/racial minorities (Weiss and Caprio 2005; Yoon and Kim 2000). However, there is little research assessing interventions targeting modifiable risk factors such as dietary and physical activity behaviors among these groups, particularly immigrant and refugee populations.

Prevention, particularly that targeting youth, is generally considered the best approach to combating the rising global prevalence of obesity (Han et al 2010). The obesity epidemic is multi-factorial making it necessary to target not only the individual, but the family and community as well. To facilitate obesity prevention at the household or family level, parents should be encouraged to offer appropriate food portions, physical activity should be incorporated into the activities of daily living and sedentary behaviors, such as television watching, should be kept to a minimum (Han et al 2010). Research has suggested that community-based interventions such as after school programs can improve dietary and physical activity choices among children (Casazza and Ciccazzo 2007; Ciliska et al 2000).

Diet and Physical Activity among Youth

The environment in which we live is often referred to as obesogenic. That is, the environment promotes excess food consumption and hinders participation in physical activity (Proctor et al 2008). Nationally representative data indicate that the majority of U.S. adolescents are not following dietary or physical activity recommendations (Centers for Disease Control 2009). In a sample of over 2,000 adolescents greater than 80% reported eating snacks between meals that consisted primarily of processed foods and fast foods (Jenkins and Horner 2005). Another

sample of more than 3,000 adolescents revealed that consumption of fats and added sugars constituted 40% of total energy intake among adolescents (Jenkins and Horner 2005). While adolescent dietary patterns are not ideal, data from 2009 indicates a slight improvement in fruit and vegetable consumption from 2007 (22.3% and 20%, respectively), however, those meeting the physical activity recommendations have decreased by almost half from 2007 to 2009 (Centers for Disease Control and Prevention 2008; Centers for Disease Control and Prevention 2009). This decrease in physical activity may not be surprising if we consider that approximately 26% of U.S. children watch more than four hours of television per day and 62% watch at least two hours (Selassie and Singh 2011). Not only does watching television mean that the individual is not being physically active, it has also been found to increase food consumption (Ulijaszek and Lofink 2006). When distracted by a stimulus such as television it is difficult for individuals to monitor how much they are consuming and thus individuals are more likely to eat if not hungry and to eat more than they intend (Stroebele and de Castro 2004; Wansink 2004). Watching television also exposes children to commercials for foods that are often high in calories, fat and sugar, which may influence food consumption (Ulijaszek and Lofink 2006).

Inadequate diet and physical activity have been linked to negative physical health outcomes and may affect a child's ability to learn (Belot and James 2011). Poor diet has been associated with decreased academic and behavioral performance in school (Pollitt 1995; Powell et al 1998). A review of studies assessing breakfast patterns by Rampersaud et al (2005) found that eating breakfast may improve cognitive functioning such as memory and test grades, and even school attendance. Participation in group physical activity has been found to help youth develop social skills, improves mental health and decreases participation in risky behaviors (Story et al 2006). This suggests that programs to improve nutrition and increase physical activity of youth may

have the benefits of both reducing obesity and improving the academic performance of all children, whether or not they are at risk of obesity (Story et al 2006). The high prevalence and wide-ranging effects of inadequate diet and physical activity justify research that seeks to improve dietary and physical activity choices among children.

Dietary Intake among Youth

There are several ways to measure dietary intake among children. Common self-report methods include the 24-hour recall, food record and food frequency questionairres. Each of these is limited by the participant's ability to accurately recall dietary intake. Although each method has its limitations each has strengths as well.

The 24-hour recall is a structured interview conducted by a trained professional. The participant is asked to report everything consumed in the previous 24 hours, generally including portions and time of day. The interview includes probing questions and multiple passes to increase the likelihood that all food and beverages are reported (McPherson et al 2000). Advantages of this type of dietary assessment include low respondent burden, it does not alter participant eating behaviors, portions are included and there is low sample bias (McPherson et al 2000; Thompson and Subar 2001). Disadvantages of this method include a high burden or cost to the investigator, multiple days are needed to obtain a sense of the participant's usual intake and underreporting and overreporting are common (Thompson and Subar 2001). Validation studies have found that the validity of reporting using 24-hour recalls increases with the age of the child (McPherson et al 2000). Therefore, 24-hour recalls may not be the most appropriate dietary assessment method as children have also been found to have difficulty reporting portion size (McPherson et al 2000).

Food records are written accounts of food and beverage intake. Participants record what was consumed, how much and what time of day. Unlike the 24-hour recall, foods and beverages are recorded at the time of consumption. This reduces errors in reporting due to memory, but may influence dietary behaviors. Food records also require multiple days of recording in order to capture a participant's usual intake, have high respondent burden and underreporting (Thompson and Subar 2001). Sample bias may also occur since individuals must be able to read and write in order to participate. A review by Livingstone and Robson(2000) found that this was the least accepted form of dietary recall by children and adolescents.

Food frequency questionairres (FFQ), unlike the two methods discussed previously, can be used at both the population and individual level (McPherson et al 2000). When completing a FFQ participants are asked to identify how often, in a given time period, they consumed a food. The list of foods included is generally based on foods commonly consumed by that target population. Portion size may or may not be inlcuded (McPherson et al 2000). The primary advantage of a FFQ is that it estimates an individual's usual intake over a period of time (Thompson and Subar 2001). There are FFQs that have been validated for use among children, however, there is debate as to how far back chidren can accurately recall intake (Burrows et al 2010).

There are inherent difficulties in assessing dietary intake, many of which become more exaggerated when working with children. Livingstone and Robson (2000) suggest that children under the age of ten are not cognitively able to reliably report intake. Other researchers propose that children must be at least twelve years of age before they have developed the abilitiy to accurately recall intake (Burrows et al 2010). Validation studies have also found conflicting results as to which method is the best (Burrows et al 2010; Livingstone and Robson 2000). To

make the situation more challenging, accuracy of recall increases with age among children, but interest in participating decreases (Livingstone and Robson 2000). Lack of interest may lead to misreporting. It is important to acknowledge the difficulties and possible sources of error whenever measuring dietary intake among children and to tailor measurement tools to the target audience.

Measures of Physical Activity

Accurately measuring physical activity can be challenging and time consuming for researchers and participants (Webster et al 2011). Physical activity can be directly measured by an accelerometer, which is a small device worn by the participant that measures change in velocity over time. Uniaxial accelerometers measure movement in the vertical plane and therefore likely underestimate non-ambulatory movements such as riding a bicycle (Robertson et al 2011). Biaxial accelerometers meaure in the vertical plane and anterioposterior plane, and triaxial accelerometers measure in the vertical, anterioposterior and triaxial planes (Robertson et al 2011). Unlike a pedometer, an accelerometer measures intensity of activity as well as frequency (Robertson et al 2011). Although accelerometers are considered the optimal tool for directly measuring physical activity, they can be costly, do not provide details on type of activity and can miss data depending on the plane of activity (Robertson et al 2011; Trueth et al 2004). A study by Robertson et al (2010) asked participants aged 7-13 years of age to wear accelerometers and complete physical activity diaries. Participant interviews indicated that data collected through the accelerometers was incomplete as participants removed the devices as required during sporting events and also out of embarassment.

More commonly physical activity is measured through self-report measurement tools such as questionnaires and diaries. Self-reported measures of physical activity provide information regarding type of activity and frequency but are often unreliable (Trueth et al 2004). This may be especially true when collecting self-reported physical activity data from youth due to their limited memory and recall skills (Trueth et al 2004). Despite its limitations, self-reported measures of physical activity are often more feasible than direct measures due to cost and skill required to use the devices.

Factors Affecting Dietary and Physical Activity Choices

Qualitative research has been used to determine factors influencing dietary and physical activity choices among youth. In a study by Neumark-Sztainer et al (1999) hunger, food cravings, appeal of the food, time and convenience appeared to have the greatest influence over dietary choices. Parental influences and food availability were also important considerations (Neumark-Sztainer et al 1999). Boys and girls indicated that they made choices based on different desired outcomes. Boys were more likely to make choices based in an attempt to grow taller, more muscular or gain/lose weight, whereas the girls made choices primarily in an attempt to lose weight (Neumark-Sztainer et al 1999). Youth also felt that eating habits became more important with age (Neumark-Sztainer et al 1999). These findings were supported by Jenkins and Horner (2005), who found that media and a lack of concern regarding diet and health were also influential. A study of low-income African American adolescents found that taste was a major limiting factor in the consumption of fruits and vegetables. Many participants stated that in order to eat vegetables they had to add sugar. Another limiting factor was lack of availability (Molaison et al 2005). O'Dea (2003) found that factors influencing physical activity choices

included perceived psychological, social and physical benefits, energy levels, time constraints and social factors. These influences did not differ by demographic factors including gender, age, race and socioeconomic status (O'Dea 2003).

A study by Xie et al (2003) indicates that actual intake is influenced by several non-modifiable factors. Females are more likely to meet fruit and vegetable recommendations, but less likely to meet dairy and meat recommendations than males (Xie et al 2003). Intake of calories and fat is higher among African American youth and lower among Asians (Xie et al 2003). Family income influences intake of protein, folate, calcium and iron, with greater income associated with greater intake (Xie et al 2003). Consumption of fruits and vegetables was also significantly higher among youth whose parents have higher income (Rediger et al 2007). Parent level of education was positively associated with intake of protein, fiber, folate, calcium, iron (Xie et al 2003) and significantly positively associated with consumption of fruits and vegetables (Rediger et al 2007; Xie et al 2003).

Participation in family meals has been found to influence several aspects of youths' dietary patterns. Increased frequency of family meals is associated with increased consumption of fruits and vegetables (Larson et al 2007) and overall diet quality (Burgess-Champoux et al 2009). Frequency of family meals is also negatively associated with frequency of skipping meals among youth (Burgess-Champoux et al 2009). It has been found that family meal frequency declines as youth age, which may be one factor in the decline of diet quality as youth age (Burgess-Champoux et al 2009; Neumark-Sztainer et al 2003). Household income also affects family meal frequency with increased income associated with greater frequency of family meals (Neumark-Sztainer et al 2003). In addition, family meal frequency is greater among youth whose mothers do not work outside of the home (Neumark-Sztainer et al 2003).

Compared to adult populations, there have been relatively few studies that examine the dietary behaviors of adolescents (McNaughton 2011). What data is available indicates that dietary behaviors worsen throughout adolescence, making childhood and early adolescence important age groups to target with education and interventions (McNaughton 2011).

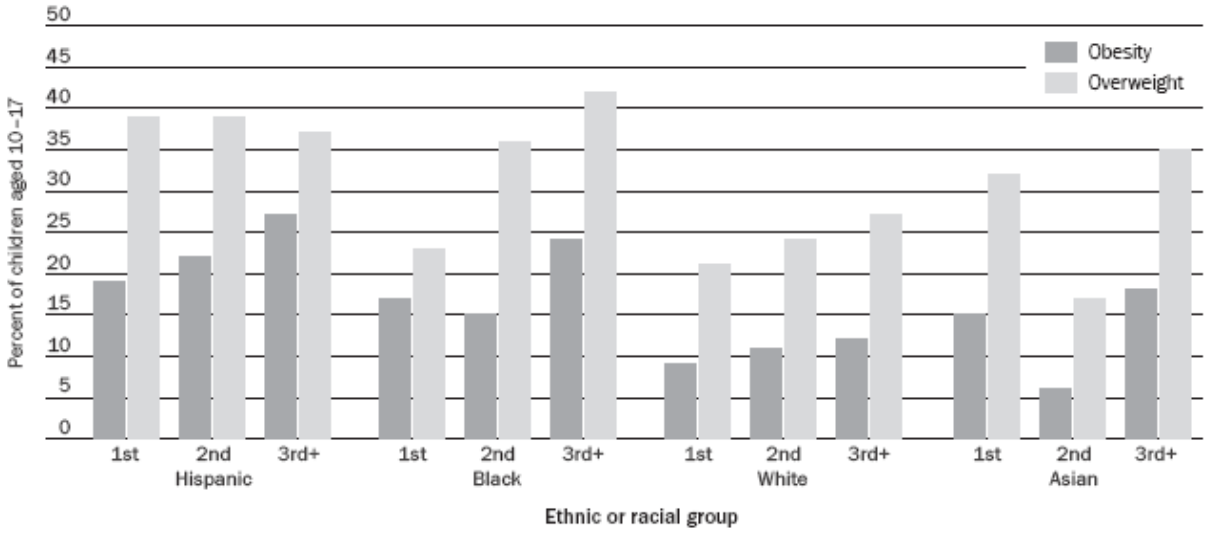
Minority and Immigrant Populations

Refugee and immigrant populations have grown dramatically over the past several decades, with the largest increases the in Asian and Hispanic populations (Satia-Abouta et al 2002). After moving to the U.S. refugees and immigrants are faced with many lifestyle changes, including diet and physical activity. For many refugees and immigrants this means a shift from consumption of a diet high in fruits and vegetables to an American diet, which is typically high in processed meats, fast foods, refined sugar and fat (Pan et al 1999; Perriera and Ornelas, 2011; Satia-Abouta et al 2002; Van Hook and Balistreri 2007). Based on data from the California Health Interview Survey, foreign born Hispanic youth drank fewer sodas and ate more fruits and vegetables than non-Hispanic white children born in the U.S. (Perriera and Ornelas 2011). However, over time, soda consumption increased and fruit and vegetable consumption decreased (Perriera and Ornelas 2011). The data go on to show that consumption of both soft drinks and fast foods were highest among African American and Latino adolescents (Kumanyika 2008). Risk of overweight and obesity and chronic diseases (eg, hypertension, ulcers, gastritis, diabetes) has been shown to increase in immigrant populations after dietary acculturation (Van Hook and Balistreri 2007; Yang et al 2007). As has been previously mentioned, lifestyle patterns such as diet and physical activity are developed early in life, making it important to target youth with interventions aiming to improve these behavior patterns (Benjamin et al 2007). This may be

especially important for youth of refugee and immigrant populations as these youth are often relied upon for translation by parents who do not speak English.

Race and ethnicity can be important determinants for risk of overweight and obesity along with chronic disease. Non-white children are more likely to be obese than their white counterparts (Proctor et al 2008). Individuals of Hispanic descent are at increased risk for overweight and obesity, while both Asian and Hispanic individuals are at increased risk for many common chronic diseases (Hedley et al 2004; Yajnik 2004; Yoon and Kim 2000). Among youth who are second and third generation immigrants, Hispanics are most likely to be overweight or obese, whereas non-Hispanic whites and Asians are the least at risk (Perriera and Ornelass 2011). Among all youth in the U.S., third-generation blacks have the highest prevalence of overweight and obesity (Perriera and Ornelass 2011). Figure 2.1 demonstrates changes in percent of children overweight and obese by race/ethnicity and generational status.

Figure 2.1: Percent Overweight and Obesity by Generational Status and Race



Source: Perreira and Ornelias 2011. Adapted from data in Gopal K. Singh, Michael D. Kogan, and Stella M. Yu, "Disparities in Obesity and Overweight Prevalenceamong U.S. Immigrant Children and Adolescents by Generational Status," Journal of Community Health 34, no. 4 (2009): 271–81.

Prevalence of obesity is lower among Asian American children, although this does not necessarily mean that Asian American children are at lower risk of health consequences (Kumanyika 2008). Asian Americans are often at risk of weight related chronic diseases at lower BMI, as they tend to have higher body fatness at these lower BMIs (Kumanyika 2008). Hispanic and Asian Americans who were born in the U.S. are twice as likely to be obese as those born elsewhere or those who have newly immigrated (Kumanyika 2008). Prevalence of overweight and obesity is lowest for foreign born youth, but the prevalence increases for each generation born in the U.S. and as the foreign born youth become adults (Kumanyika 2008; Perriera and Ornelas 2011). Despite these increased risks interventions targeting these populations are lacking.

Socio-economic Status

Socio-economic status (SES) is related to many health indicators, including childhood overweight and obesity. In general, children from low income families eat fewer fruits and vegetables and ethnic/racial minorities tend to spend more time watching television than non-Hispanic whites (Delva et al 2007). Delva et al (2007) analyzed data collected by the Monitoring the Future study 1998 to 2003, and found that more black and Hispanic youth were at or above the 85^{th} percentile for BMI than non-Hispanic white youth, at every SES level, except black boys of low SES who were slightly less likely than non-Hispanic white boys of low SES.

Nationally representative data following obesity trends in minority communities indicate an association between low SES and increased risk of obesity (Selassie and Sinha 2011). Socioeconomic status has been shown to influence energy intake and energy expenditure,

thereby affecting body fat storage (Zhang and Wang 2003). Communities composed primarily of racial/ethnic minorities and individuals who are of low SES have fewer settings that facilitate physical activity (Delva et al 2007). This may in part be explained by the fact that grocery stores in low SES communities tend to have minimal offerings of fruits, vegetables, and other fresh items or offer them at greater cost than calorie-dense or processed foods (Selassie and Singha 2011). Parks and recreational areas are often scarce in lower-income communities, decreasing the emphasis on outdoor play among youth, and therefore participation in physical activity (Selassie and Singh 2011). To futher confound these issues, parents in low-income neighborhoods often discourage their children from playing outdoors due to safety concerns (Selassie and Singha 2011).

There are marked differences in obesity prevalence among U.S. children based on race/ethnicity and SES (Singh et al 2010). Under the umbrella of SES, disparities in the prevalence of childhood overweight and obesity were observed for parental education, household poverty status and race/ethnicity (Singh et al 2010). Ethnic minorities are generally more likely to live in poverty and to be undereducated and underemployed (Kumanyika, 2008). Lower educational attainment of parents was associated with lower consumption of vegetables, fruit and dairy among adolescents (Videon and Manning 2003). Blacks and Hispanics were less likely to report skipping breakfast, but more likely to report poor vegetable and dairy consumption (Videon and Manning 2003).

Sociodemographic factors can influence health through through biologic pathways such as stress, familial and genetic factors as well (Singh et al 2008). Singh et al (2008) analyzed data from the National Survey of Children's Health, and found that Hispanic and black children were 1.8 and 2.3 times more likely to be obese than their non-Hispanic white counterparts. Children

whose parents did not have a high school diploma were 2.2 times as likely to be obese compared to children whose parents were college-educated. Children whose families lived below the poverty line were 2.8 times more likely to be obese than those with a family income 400% of the poverty line. Among the many factors that make up SES ethnicity (particularly black and Hispanic), lower household education, higher poverty levels, increased levels of television viewing and physical inactivity have been found to be independently associated with significantly increased risk of childhood obesity (Singh et al 2008). Disparities in childhood obesity related to SES have increased over time, indicating the importance of targeting those at risk (Singh et al 2008).

Cultural Influences

Cultural influences on food choices and eating patterns are well established. Types and amounts of food along with flavors, textures, and food combinations vary between cultures (Kumanyika 2008; Stead et al 2011). Food often has different uses and meanings amoung ethnic groups and societies (Kumanyika 2008; Stead et al 2011). Food can also hold symbolic meanings, create social interactions, and provide pleasure and punishment (Kumanyika 2008; Stead et al 2011). These cultural influences affect how adults feed their children and how children are socialized to choose foods for themselves (Bruss et al 2003; Kumanyika 2008). Ethnic groups hold differing cultural beliefs and practices with respect to food and feeding. These differences may be one of the factors contributing to racial/ethnic disparities in rates of childhood obesity (Kumanyika 2008).

The greatest increases in the prevalence of childhood obesity have been observed in African American and Hispanic youth (Weiss and Caprio 2005). Part of the explanation for this may lie

in the differing perceptions of weight and body size by culture and ethnicity. In a study of WIC mothers those that were of ethnic minority did not accept growth charts as a means for determining their child's weight and felt that large body size was culturally acceptable as long as the child was "healthy, active and has good self-esteem" (Kumanyika 2008). Myers and Vargas (2000) found that among Hispanic parents, more than one third did not percieve their obese child as overweight. Cultural acceptability of over consumption and obesity may be a result of past or recurrent economic deficiency (Kumanyika 2008). Foods such as meats, fats and sugars are often associated with economic status and upward social mobility. Larger body size is viewed by some cultures as attractive and an indication of wealth, fertility, beauty and health (Ulijaszek and Lofink 2006). African American women who are overweight or obese are more likely than overweight or obese non-Hispanic white women to view themselves as healthy and attractive to the opposite sex (Ulijaszek and Lofink 2006). Both African American and Hispanic women are less likely than non-Hispanic white women, of the same BMI, to report disatisfaction with their body size (Fitzgibbon et al 2000; Ulijaszek and Lofink 2006). In some cultures being thin may be associated with being ill, a drug user, or of low economic standing (Kumanyika 2008). These variations in perception of a healthy body size, weight or BMI may further affect how parents view childhood overweight and obesity.

Cultural influences on factors affecting childhood obesity suggest that culturally-tailored interventions are needed (Kumanyika 2008). Traditional interventions may not be as effective in minority populations as compared to other populations (Kumanyika 2008B). Changing attitudes and improving skills may not lead to long-term behavior change without the support of social/cultural acceptability (Kumanyika 2008B).

After-school Interventions

Programs targeting dietary and physical activity behaviors of youth offered in non-traditional educational settings such as community clubs, churches and after-school childcare, are becoming increasingly common (Freedman and Nickell 2010). Such community-based programs can be tailored to the specific needs of community and have the potential for improving the health of youth through education, increased participation in physical activity, and improved dietary choices (Freedman and Nickell 2010). Part of this influence can be through the provision of healthful snacks and opportunities to participate in physical activity. Snacks often account for up to 25% of daily energy intake and up to 40% of added sugars, making it important to teach youth to consume more healthful snacks such as fruits and vegetables (Freedman and Nickell 2010). A study by Freedman and Nickell (2010), found that participants in an after-school nutrition program significantly increased consumption of vegetables and milk between pre- and post-test. The Creating Opportunites for Personal Empowerment (COPE) after-school program also was successful in changing lifestyle patterns of youth. Participants met 15 times over the course of 9 weeks. Session topics included emotional eating, food groups for a healthy eating, appropriate portion sizes and social eating strategies (Melnyck et al 2007). Participants in the intervention group lost significantly more weight than those in the control group and survey data indicated that participants felt the COPE program was helpful in changing eating behaviors such as increasing consumption of fruits and vegetables (Melnyck et al 2007). The twelve week long Students and Parents Actively Involved in Being Fit after-school program targeted urban African American middle school students and their parents and aimed to increase consumption of fruits and vegetables and participation in physical activity (Engels et al 2005). Consumption of fruits

significantly increased for both parents and students. Students also reported significant increases in consumption of salads and non-fried potatoes.

As schools are becoming more and more hesitant to allot class time to non-academic activities such as health promotion, after-school settings may be the future for nutrition and physical activity interventions (Kedler et al 2005). This is evident in the Coordinated Approach to Child Health (CATCH) Kids Club (CKC) program. Typically CATCH utilizes class time but CKC was developed to pilot test an after-school program (Kedler et al 2005). This pilot program included students in grades 3-5 from 16 schools. Following the program participants reported significant increases in physical activity during reces, nutrition knowledge and vegetable intake. Although not at a statistically significant level, nearly all other variables of interest changed in desired direction (Kedler et al 2005). The YMCA conducted the Food Fit nutrition program in 5 after-school programs throughout Ohio. The program was 6 weeks in duration and targetted 3rd, 4th and 5th graders (Branscum and Kaye 2009). Following the intervention participants reported significant increases in consumption of fruits and vegetables as snacks, citrus fruits and juice and raw vegetables (Branscum and Kaye 2009). Participants also reported a significant increase in reading food labels when making food choices.

School-based Interventions

Schools are in a exclusive position to play a critical role in promoting healthy lifestyle choices and aiding in the prevention of childhood obesity (Belansky et al 2010; Ellis et al 2005). Reaching more than 95% of all U.S. children aged 5-17 years and having more continuous and intensive contact with youth during the first two decades of their lives than any other institution, schools have the potential to play an important role in the behavioral choices of youth (Roseman

et al 2011; Story et al 2006). Because of this, schools have been the setting of choice for most randomized obesity prevention trials (Han et al 2010). School-based nutrition and physical activity intrerventions have been successful. Howerton et al (2007) reviewed seven school-based nutrition programs that aimed to increase fruit and vegetable consumption among participants. Of these seven programs, six saw a statistically significant increase in fruit and vegetable consumption (Howerton et al 2007). The "High 5" project, conducted in elementary schools, saw a statistically significant increase in consumption of fruits and vegetables for both children and parents in the intervention group (Reynolds et al 2000). There were also significant increases in nutrition related knowledge such as the food guide pyramid and the 5 A Day recommendations (Reynolds et al 2000). A nutrition and physical activity program conducted in Florida schools found that a school-based program can significantly decrease the number of meals skipped and significantly increase nutrition related knowlede, physical activity and perceived ability to make healthier dietary choices (Casazza and Ciccazzo 2008). This study also found that the computer delivered intervention was slightly more effective than the traditionally delivered intervention in changing behaviors.

A review of school-based interventions found several common methods utilized by interventions that achieved positive statitically significant results and based on these methods offered suggestions for future interventions (Roseman et al 2011). These suggestions included: 1) Nutrition interventions should be behaviorally focused, 2) Interventions should include multiple components (e.g., family norms, knowledge, access to healthful food options) (Ciliska et al 2000; Hoelscher et al 2002), 3) Healthful changes in the food and school environment can improve behaviors changes at the population level, 4) Family involvement enhances the effectiveness of school-based programs, 5) Incorporation of student self-assessments, 6)

Inclusion of quantitative evaluation measures that capture food-related behaviors, eating patterns, and anthropomentric measures, 7) Interventions should have links to the larger community, 8) More studies should include ethnic/cultural groups, 9) Use of innovative multimedia technology tools, 10) Nutrition education should be sequential, with sufficient duration and intensity (Roseman et al 2011). Short-term interventions, those lasting less than 6 months, have achieved positively significant results, however, the continuation of these results have not been observed long-term (Roseman et al 2011). This suggests the need for long-term follow-up. Additionally, Hoelscher et al (2002) suggest that because adolescents of middle school age have more autonomy than younger children when it comes to making dietary choices, they are better able to make decisions with regard to perceived outcomes. Therefore, effective nutrition education with an adolescent target population should include critical-thinking (Hoelscher et al 2002).

One of the techniques of successful interventions, as listed above, is the inclusion of families. Dietary behaviors are affected by opportunities to share family meals, by the amount and time spent watching television, by a parent's child-feeding methods, by a mother's knowledge of nutrition, by a child's exposure to food, and by parental role-modeling (Ellis et al 2005; Rhee 2008). Studies indicate that adolescents who ate dinner with their families every day consumed 0.8 more servings of fruits and vegetables than adolescents who reported never or rarely eating dinner with their familiy (Jenkins and Horner 2005). Adolescents who ate dinner with their family also consumed lower amounts of saturated and trans fats (Jenkins and Horner 2005). The frequency of family meals decreases with adolescence, which is of concern as adolescents report associating eating healthy foods with eating family meals (Jenkins and Horner 2005). Frequency of family meals was the most influential parental factor for dietary choices (Videon and Manning 2003). Due to the significant role parents play in the dietary choices and food preferences of

children it is essential that parents be targeted with nutrition interventions as well to provide them with the knowledge and skills to make healthy choices not only for their children but for themselves (Hoerr et al 2005; Matheson et al 2002; Rhee 2008).

Community Influence

The community in which one lives can have a strong impact on one's health (Berkman and Kawachi 2000; Petersen 2002). For the most part, humans do not live in isolation. We live in communities, interact with other humans and depend on other community members for services that impact our daily lives. These interactions with and dependance on others necessitates a certain level of trust among community members. Trust is an important aspect of social capital, which has been found to impact health and behavior choices (Berkman and Kawachi 2000; Petersen 2002). Social capital is defined as "those features of social structures – such as levels of interpersonal trust and norms of reciprosity and mutual aid – which act as resources for individuals and facilitate collective action" (Coleman 1990; Putnam 1993). In order to have high levels of social capital people and organizations of a community must work together in an atmosphere of trust to accomplish goals of shared benefit (Petersen 2002).

Berkman and Kawachi (2000) present a list of eight fields that increased social capital has been found to benefit. These fields include 1) Families and youth behavior problems, 2) Schooling and education, 3) Community life, 4) Work and organizations, 5) Democracy and governance, 6) Economic development, 7) Criminology, and 8) Public health. There are several hypotheses for the ways in which social capital impacts health. One is that social capital inlfuences the health behaviors of community residents by promoting the dissemination of health information, which may lead to the adoption of healthy norms of behavior (Berkman and

Kawach, 2000). The basis of this theory is that in a socially cohesive community with high social capital members will know and trust each other, making the diffusion of information easier (Berkman and Kawachi 2000). Another hypothesis of how social capital can influence health is that it exercises control over undesirable health behaviors (Berkman and Kawachi 2000). Lastly, social capital may impact health by influencing access to local services and facilities. For example, socially cohesive communities are more active and better able to protect public programs and services in the face of budget cuts (Berkman and Kawachi 2000).

Community-academic Partnerships

As the name implies, a community-academic partnership is a partnership between a community organization and an academic institution. It is important to emphasize the word partnership as this is what distinguishes this type of research from more tradional research designs. By definition, individuals and communities are included as partners in the research process instead of as passive research subjects (Seifer et al 2003). By involving the community as a partner trust is established between the community and researchers, which may be particularly important when working with disadvantaged communities (Seifer et al 2003). Partnering with a community organization provides access to individuals with experience in the community, which is important in creating an intervention that not only better addresses the needs of the community, but an intervention that can be implemented in a way that is acceptable to the community. Previous experience working with the community can result in a well established relationship between the community organization and the community, which may improve community buy-in and participation (Draper et al 2010; Seifer et al 2003). When a true partnership is formed knowledge is gained by not only the academic institution, but by the

community as well. These increases in knowledge and skills can increase capacity and empowerment of the community (Seifer et al 2003). Lastly, by including the community in the decision making process, interventions are able to address health concerns from both the positive and ecological perspectives (Seifer et al 2003).

While community-academic partnerships offer benefits for both the community members and the academic instutions they can be difficult to form. Time is generally a major limiting factor in forming a community-academic partnership. In order to develop a partnership, time is needed to form relationships, build trust, take part in participatory processes and develop organizational structures (Seifer et al 2003). Participatory processes include identifying research priorities, which are often time consuming as the research priorities not only have to be agreed upon by both community and academic partners, but must fit within the scope of funding guidelines. Creating and implementing the intervention as well as disseminating results are also part of the participatory processes (Siefer et al 2003). Funding is another factor making community-academic partnerships difficult. The time needed to develop and sustain a community-academic partnership is often not valued by funding agencies, making it difficult to receive enough funding to cover the entire process (Seifer et al 2003). Community- academic partnerhsip are also a relatively new concept. This can make funding agencies uncomfortable and less likely to choose a proposal that utilizes a community-academic partnership.

Dispite the inherent difficulties in forming and maintaining community-academic partnerships, the need for such collaborations is evident. Many of the most pressing public health concerns have environmental factors that are more successfully addressed with the inclusion of the community.

Community-based Participatory Research

Community- academic partnerships often utilize CBPR. CBPR is "a collaborative approach to research that engages partners from a community – geographic or otherwise defined – in all phases of the research process with a shared goal of producing knowledge that will be translated into action or positive social change for the community" (Oakes and Kaufman 2006). This research method involves community representatives, academic researchers and public health professionals who work together to analyze and address health concerns of the community (Schulz et al 2003). Community representatives often include staff of community agencies and community residents, and these representatives can hold a variety of positions such as advisors, program implementers, and data collectors, to name a few (Seifer et al 2003). Most often communities are defined by geographic location, but can also be defined by a shared set of concepts or social relationships that bind individuals with a sense of community, such as race (Ansari 2005; Schulz et al 2003).

CBPR is a unique research method in that the partners are included in assessing community needs, the development of knowledge and of efforts to address community needs and in implementing and analyzing these efforts (Higgins and Metzler 2001; Schulz et al 2003). Although, members of the partnership may not participate in all aspects of the research process to the same extent. By the active inclusion of all partners, CPBR allows community members to become active stakeholders in the research process instead of passive research subjects (Schulz et al 2003). CBPR brings together diverse partners who contribute different perspectives, expertise and resources (Higgins and Metzler 2001; Naylor et al 2002; Schulz et al 2003). Utilization of these multiple perspectives and resources can effectively create solutions to community concerns (Naylor et al 2002; Schulz et al 2003). The primary strength of the CBPR

approach is that each partner contributes unique perspectives and skills, and the use of these varied resources towards a common goal strengthens the partnership (Schulz et al 2003).

Community partners are much more involved in the community and more knowledgeable about community needs and shortcomings than outside researchers. They may also be better able to identify other community partners, make contacts, build networks within the community and recruit participants. Established community organizations will likely have already gained the trust of the community, making members more likely to feel as though the intervention or program is in the community's best interest and not just for the sake of research. Also, the intervention will better represent the needs and culture of the community, and thus members will be more likely to support it. Cultural appropriateness of the interventions and research tools is important as it will increase the likelihood of affecting a change and measuring this change (Seifer et al 2003).

Community organizations benefit from being a part of CBPR as well. Following the resarch project organizations report increased skills in areas such program implementation, data collection and increased access to resources (Seifer et al 2003). An additional benefit for the community organization may include increased access to funding as they now have data to support their program, improved grant writing skills and results from their project may have been published. Lastly, giving communities an active role in the research process increases capacity and promotes ownership and sustainability (Scarinci et al 2009).

CBPR comes with its share of challenges as well. There are inconsistent definitions of CBPR and more specifically the role the community should play in CBPR (Draper et al 2010). There are also debates as to the purpose of CBPR and how much power should be given to community members (Draper et al 2010). Community members may be leery of the researcher motives, how

participants will be treated and how the community will be portrayed in the dissemination of results (Seifer et al 2003). This may be especially true for communties of ethnic/racial minorities or of low SES communities. There is long-standing mistrust by communities of color of health researchers (Higgins and Metzler 2001). This further supports the necessity to allow adequate time for the development and maintanace of a trusting relationship between all partners. Perhaps not surprisingly, time is often a limitation when conducting CBPR. As discussed previsouly, time is needed for a trusting relationship between community and academic partners. Once trust has been established it takes time to agree upon research priorities, outline the roles of members of the research team, create the intervention, implement the intervention and disseminate results. When conducting CBPR it is important to consider all stakeholders when disseminating results. This often means disseminating results in more than one format, which again requires time. CBPR can require extra time for logistic reasons as well. Academic partners may not live or work in the same community in which the research is conducted. Thus, additional time may be necessary, especially during the early phases of the research, to allow for travel. As is the case for many research projects, regardless of the methods, lack of funding is a constraint for most CBPR projects (Seifer et al 2003). CBPR is a relatively new method of research and may be viewed by funding agencies as less rigorous than more traditional methods (Seifer et al 2003). This can result in a lack of opportunities for funding. As with community-academic partnerships (see Table 2.1 for a detailed comparison of community-academic partnerships and CBPR), the time required to form relationships and build trust is often not valued and therefore funding may not be provided for that time. Lack of funding can be a cause of conflict among partners if a budget is not agreed upon or partners do not feel as though funds are being distributed fairly (Seifer et al 2003).

Cultural differences can pose another challenge for CBPR. Community members and researchers often come from different cultural backgrounds. These differences can include ethnic/racial differences, but also scientific versus non-scientific ways of thinking (Seifer et al 2003). It is imperative that researchers take these cultural differences into account when interacting with the community and in creating and implementing interventions as well as evaluation tools. For example, the term Hispanic (or Latino) is often used to describe individuals from a wide variety of cultures and ethnicities. Research related to dietary behaviors often incorrectly assumes that all Hispanic individuals eat the same types of "ethnic" foods. If a tool designed to assess the eating habits of a predominately Hispanic population is created but does not include foods specific to the population, the tool will likely not truly capture the desired information.

Although increased ownership by the community is listed as a strength of CBPR, is can still be difficult to get the community partners to truly take ownership of the research process, interventions and results (Seifer et al 2003). Community members may feel as though their input is not actually valued and they may not be confident in their abilities to continue the program without the help of the academic institutions (Seifer et al 2003). Lastly, conflict of priorities can arise between the community organzition and the academic institutions as well as between the community and the funding agency. Funders may expect a research project involving a health problem that is not deemed a main concern by the community. Thus, open communication from the beginning of the research process is imperative, as is detailed documentation of any research agreements.

The field of CBPR is still emerging and is in its infancy, when compared to more traditional research methods. As the evidence of the influence a community (and other environmental

factors) can have on health outcomes becomes apparent so does the need for community involvement. Empowerment of the community increases program sustainability, which is necessary to truly have an impact on public health priorities such as childhood obesity.

Collaboration between the community and academic researchers is an essential approach for increasing the chances of success for community health promotion and public health research (Ansari 2005). Collaboration requires the exchange of knowledge, sharing of resources and working towards common goal (Ansari 2005). Such collaborations can improve community capacities by providing training and experiences with respect to organizational, leadership and programmatic strategies (Ansari 2005).

Program Evaluation

In addition to CBPR, it is important to give an overview of program evaluation. At its most basic definition, evaluation is the process of defining the merit, worth of value of something (Rossi and Lipsey 2004). Henry (2003) proposes three ways in which evaluation can contribute to social improvement 1) Determining the common good, 2) Selecting a course of action, 3) Adapting the course of action. Evaluations have the ability to change attitudes or behaviors, influence others, justify or disprove policies, and call attention to a community concern (Henry 2003). This is important for social programs, as it can provide affirmation of worth, value, improvement, accountability, and provide a basis for ending ineffective programs or policies (Rossi and Lipsey 2004). Evaluations can have various targets including individuals, programs, projects, products, equipment, services, or organizations. There are many types of evaluation (see Table 2.2) that can be used to answer a variety of questions. Evaluation questions include (but are not limited to) what is the nature and scope of the problem, who is the target audience,

how should the intervention be delivered and by whom, is the intervention reaching the target audience, is the intervention being implemented and received as intended, is the intervention effective (Rossi and Lipsey 2004).

There are five guilding principles of evaluation 1) Conduct systematic, data-based inquiries, 2) Provide competent performance to stakeholders, 3) Display honesty and integrity throughout the evaluation process, 4) Respect the security, dignity and self-worth of all stakeholders, 5) Take into acount general and public interests (Rossi and Lipsey 2004). With respect to principle number one, it is important to adhere to high technical standards of research when conducting an evaluation. Evaluators must examine both the strengths and weaknesses of the evaluation questions and approaches to answering these questions (Rossi and Lipsey 2004). It is also necessary to communicate these approaches, along with evaluation methods and limitations truthfully (Rossi and Lipsey 2004). As Table 2.2 indicates there are a variety of types of evaluation. Additionally, there are many different types of programs that can be evaluated. Therefore, not every evaluator will possess the competencies needed for every evaluation. Thus, as principle number two indicates, evaluators ought to possess the necessary skills and experience for the specific evaluation, exhibit cultural competence and strive to advance competencies (Rossi and Lipsey 2004). The findings of a program evaluation are used to determine the worth of the program and can be used as justification to end an ineffective program. Stakeholders will have varying vested interests in the program, making evaluation inherently political (Mohan and Sullivan 2007). With the political aspect of evaluation in mind, it is imperative that evaluators are honest in their negotiations with clients and stakeholders and are transparent with any conflicts of interest (Rossi and Lipsey 2004). Considering the major impact evaluation can have on a program and therefore the stakeholders of that program,

principle number four helps to ensure that stakeholders are protected with respect to confidentiality, benefits to stakeholders are maximized while risks are minimized and stakeholder diversity is respected (Rossi and Lipsey 2004). Finally, principle number five addresses the importance of including the perspectives of all pertinent stakeholders, while at the same time addressing the needs and priorities of clients and stakeholders. The needs and priorities of the stakeholders will aid the evaluator in assessing any side effects of the evaluation and in discerning the most appropriate way to present results (Rossi and Lipsey 2004).

Process evaluation and outcome evaluation are commonly utilized by CBPR. Process evaluation answers questions such as whether the program is being delivered as planned, whether the appropriate population is being recruited to participate in the program, what is the context in which the program functions, what is the reach of program materials by the target audience, and what are barriers/facilitators to implementing the program (Rossi and Lipsey 2004). It is important to answer these questions, as this data can give an indication as to whether the program was ineffective due to an implementation failure or a program failure. Ineffectiveness is not always a result of a program failure. Implementation failure can also result in a program not producing the desired results. Not distinguishing between these two types of failures can lead to an evaluation recommending that a potentially effective program be ended.

Outcome evaluation may be the most common or well known type of evaluation. The key questions of an outcome evaluation are whether or not the hypothesized changes are occurring and if so, are these changes due to the program (Rossi and Lipsey 2004). These questions are often answered through statistical analyses used to assess change between measurements or differences between study groups. Without process evaluation results of an outcome evaluation will likely be used to assess the merit or worth of a program. While outcome results are certainly

an appropriate part of assessing merit or worth, process evaluation can help explain these outcome results. When determining outcome questions it is imperative that the priorities of the relevant stakeholders are taken into account. However, it is also important that the outcome questions can be answered by the intervention methods. Outcome questions that are not applicable to the intervention methods may falsely indicate that the program is ineffective.

Evaluation is an important aspect of the research process especially for programs that are in their early stages. However, evaluation of CBPR is often viewed as not rigorous in terms of scientific methodology (Scarinci et al 2009). Even community partners may view evaluation of CBPR not as research but as a community service since the community is benefiting (Scarinci et al 2009). CBPR involves development and implementation of a participatory evaluation process in which stakeholders and participants are part of the process. Information gleaned from such an evaluation can point out successful and unsuccessful aspects of a program, allowing for appropriate changes to be made. This is especially necessary when dealing with a health issue such as obesity. The modifiable risk factors of obesity, diet and physical activity patterns, are developed early in life, influenced by many uncontrollable factors and difficult to change. Thus, in order to create effective interventions researchers must learn from the successes and failings of previous programs.

Table 2.1: Community-academic Partnerships vs. CBPR

	Community-academic Partnership	**CBPR**
Definition	Partnership between a community organization and an academic institution, in which the community is included as partners in the research process instead of as passive research participants	A collaborative approach to research that engages partners from a community in all phases of the research process
Who is involved?	Staff of community agencies Community residents Researcher partners from an academic insitution	Staff of community agencies Community residents Researcher partners from an academic insitution or community research organization
Strengths	Builds on strengths and resources within the community Facilitates equitable involvement of partners in all phases of the research process Integrates knowledge for the mutual benefit of all partners Promotes co-learning and community empowerment Addresses health from positive and ecological perspectives Increased community buy-in and participation	Sustains trusting relationships Builds on strengths and resources within the community Builds capacity within community organizations Increases cultural appropriateness Increased community buy-in and participation
Weaknesses	Time is a major limiting factor	Communities may mistrust

	Lack of funding – funding agencies often will not provide funding to cover the entire process of developing and sustaining a partnership Often not viewed as scientifically rigorous Limited number of academic institutions pursing partnerships	researcher motives Lack of time Lack of funding Getting community to take ownership – community members may feel their input is not truly valued or that they will not be able to continue the program without the academic institution Conflict of priorities between community and researchers or community and funding agency

Sources: Oakes and Kaufman 2006; Siefer et al 2003

Table 2.2: Types of Evaluation

Type	Primary Questions	Primary Audiences	Function
Needs Assessment	How big is the problem? How expensive is the problem? Where is the problem the worst? What other programs are in place to adress this problem? What are the characteristics of the target group? What is the existing knowledge and attitudes about the problem?	Individuals responsible for program resources Individuals responsible for creating the program	Planning further evaluation Program development
Community Assessment	What problems exist in the community? What needs are not being met? What resources are available for addressing exisitng problems? What resources are needed? What are the facilitators and barriers for a program?	Individuals responsible for program resources Individuals responsible for creating the program	Planning further evaluation Program development
Marketing Study	Will the target audience use the proposed program?	Individuals responsible for program resources	Planning further evaluation Program development

Formative Evaluation	Is the proposed program appropriate for the target audience? Are the program materials understood and well-received?	Individuals responsible for program resources	Planning further evaluation Program development
Process Evaluation	Is the program being delivered as planned? Is the target population being recruited to participate? Are partiicpants continuing to participate? What is the context in which the program exists? What is the reach and acceptance of program materials? What is the level of use of program materials? What are the barriers and facilitators to implementing the program?	Program director Program staff Funders	Program improvement Accountability Link to outcome findings
Outcome Evaluation – Short term	Are the hypothesized short term or intermediate changes a result of the program?	Individuals responsible for program resources Individuals concerned with program effectiveness	Accountability Testing hypotheses Continuation decisions
Outcome Evaluation – Long term	Are the hypothesized long term changes a result of the program?	Individuals responsible for program resources Individuals concerned with program effectiveness	Accountability Testing hypotheses Continuation decisions

Satisfaction Study	Is the target audience satisfied with the program?	Program director Program staff Consumers Funders	Program improvement Accountability
Best Practices Study	Is the program consistent with what has already been identified as effective for this type of program?	Program director Program staff Related programs Funders	Program improvement Accountability
Sub-group Analysis	Is the program particularly effective for certain sub-groups of the target population?	Individuals responsible for resources Individuals concerned with program effectiveness and development	Program improvement
Component Analysis	Are certain aspects of the program particularly effective?	Individuals responsible for resources Individuals concerned with program effectiveness and development	Program improvement
Cots-Benefit Evaluation	Is the cost of the program proportionate with the benefits?	Individuals responsible for resources Individuals concerned with program effectiveness	Accountability Continuation decisions

Source: Davis 2010; Rossi and Lipsey 2004

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Chapter 3

EVALUATION OF A COMMUNITY-BASED NUTRITION AND PHYSICAL ACTIVITY INTERVENTION TARGETING YOUTH FROM IMMIGRANT AND REFUGEE FAMILIES[1]

[1]Seaver O, Mullis RM, Bason J, Davis M, Hanula G, Lewis R. To be submitted to the Journal of Nutrition Education and Behavior.

Abstract

Objective: To evaluate a community-based nutrition and physical activity intervention targeting youth from immigrant and refugee families. The intervention aimed to increase consumption of fruits, vegetables and healthy foods while decreasing consumption of unhealthy foods. The interventions also aimed to increase participation in physical activity.

Design: The study was a multi-site educational intervention trial. The intervention consisted of 6 lessons taught at 6 after-school programs. Interviews were conducted with parents of participants following the intervention.

Setting: After-school programs in metro Atlanta.

Sample: Intervention participants were both males and females and included, Asian, Hispanic and African American youth aged 5-16 years. Twenty-three participants completed all 3 waves of data collection.

Main Outcome Measures: Consumption of fruits, vegetables, healthy foods and unhealthy foods. Participation in physical activity, sedentary activities and BMI percentile.

Analysis: Descriptive statistics including means, standard deviations and percentages were calculated. ANOVA was used to determine changes in dietary and physical activity behaviors and BMI percentiles between baseline and follow-up data. Regression analyses were used to identify any independent variables significantly associated with the dependent variables.

Results: There were no statistically significant changes in dietary or physical activity behaviors or BMI percentile overall or within sites. Consumption of fruits, vegetables, healthy foods and unhealthy foods increased overall. Participation in physical activity decreased and participation in sedentary activities increased. Dietary and physical activity behaviors were significantly associated with site, age and BMI percentile.

Parents indicated that lack of money and child preferences were the main barriers to healthy eating. Parents felt that following the intervention their children were more aware of which foods are healthy and more willing to try new foods. The primary suggestion for improvement was to add a parent component to the intervention.

Conclusions and Implications: Results of this study indicate that community-based nutrition and physical activity interventions can improve dietary and physical activity behaviors of youth from immigrant and refugee families. However, more ethnic specific curriculum and measurement tools may improve outcomes.

Introduction

As the rates of overweight and obesity continue to rise preventive programming becomes increasingly important. Prevention, particularly that targeting youth, is generally considered the best method for addressing the worldwide obesity epidemic (Han et al 2010). While some risk factors for overweight and obesity are not modifiable, the important roles that diet and physical activity patterns play are well established. However, nationally representative data indicate that many U.S. youth do not consume a healthy diet or participate in the recommended 60 minutes of physical activity per day (Centers for Disease Control 2009). Overweight and obese children are at risk for many common chronic diseases (Benjamin et al 2007; Eisenberg et al 2003; Strauss et al 2003) that are expensive both in direct medical costs and decreased quality of life (Schwimmer et al 2003). Overweight and obesity along with comorbidities that develop during adolescence are likely to continue into adulthood (Wisemandle et al 2000). Racial/ethnic minorities are often at increased risk for such comorbidities, even at lower BMIs.

Refugee and immigrant populations have grown dramatically over the past several decades, with the largest increases in the Asian and Hispanic populations (Satia-Abouta et al 2002). After moving to the U.S. refugees and immigrants are faced with many lifestyle changes, including diet and physical activity. For many refugees and immigrants this means a shift from a diet high in fruits and vegetables to a diet high in processed meats, fast foods, refined sugar and fat (Van Hook and Balistreri 2007; Pan et al 1999; Perriera and Ornelas, 2011; Satia-Abouta et al 2002). Risk of overweight and obesity and chronic diseases (eg, hypertension, ulcers, gastritis, diabetes) has been shown to increase in immigrant populations after dietary acculturation (Van Hook and Balistreri 2007; Yang et al 2007). Lifestyle patterns such as diet and physical activity are developed early in life, making it important to target youth with interventions aiming to improve

these behavior choices (Benjamin et al 2007). This may be especially important for youth of refugee and immigrant populations as these youth are often relied upon for translation by parents who do not speak English, which may give youth increased dietary autonomy at younger ages.

Race and ethnicity can be important determinants for risk of overweight and obesity along with chronic disease. Non-white children are more likely to be obese than their white counterparts (Proctor et al 2008). Individuals of Hispanic descent are at increased risk for overweight and obesity, while both Asian and Hispanic individuals are at increased risk for many common chronic diseases (Hedley et al 2004; Yajnik, 2004; Yoon and Kim 2006). Among youth who are second and third generation immigrants, Hispanics are most likely to be overweight or obese, whereas non-Hispanic whites and Asians are the least at risk (Perriera and Ornelass 2011). Prevalence of obesity is lower among Asian American children, although this does not necessarily mean that Asian American children are at lower risk of health consequences (Kumanyika 2008). Asian Americans are often at risk of weight related chronic diseases at lower BMI, as they tend to have higher body fatness at these lower BMIs (Kumanyika 2008). Prevalence of overweight and obesity is lowest for foreign born youth, but the prevalence increases for each generation born in the U.S. and as the foreign born youth become adults (Kumanyika 2008; Perriera and Ornelas 2011). Despite these high risks, interventions targeting these populations are lacking.

Cultural influences on food choices and eating patterns are well established. Types and amounts of food along with flavors, textures, and food combinations vary between cultures (Kumanyika 2008; Stead et al 2011). Food often has different uses and meanings amoung ethnic groups and societies (Kumanyika 2008; Stead et al 2011). Food can also hold symbolic meanings, create social interactions, and provide pleasure and punishment (Kumanyika, 2008;

Stead et al 2011). These cultural influences affect how children are socialized to choose foods for themselves (Bruss et al 2003; Kumanyika 2008). These differences may be one of the factors contributing to racial/ethnic disparities in rates of childhood obesity (Kumanyika 2008).

Cultural influences on factors affecting childhood obesity suggest that culturally-tailored interventions are needed (Kumanyika 2008). Traditional interventions may not be as effective in minority populations as compared to other populations (Kumanyika 2008B). Changing attitudes and improving skills may not lead to long-term behavior change without the support of social and cultural norms (Kumanyika 2008B).

The current epidemic of childhood overweight and obesity is markedly increasing obesity-related disorders in children and is multifactorial, making it necessary to target not only the child, but the community. Studies have shown that community-based interventions can improve dietary behaviors of youth (Casazza and Ciccazzo 2007; Ciliska et al 2000; Howerton et al 2007). However, there is a distinct lack of research focusing on youth from immigrant and refugee families. This is an important group to target as dietary acculturation leads to increased risk of overweight and obesity along with chronic disease (Van Hook and Balistreri 2007; Yang et al 2007).

Methods

Study Design: The study was a multi-site educational intervention trial. The intervention consisted of 6 lessons taught at 6 after-school programs. Each lesson was approximately 1 hour in length and included a hand-on food demonstration. Lessons were based on the *Food Talk* program from the University of Georgia's Expanded Food and Nutrition Education Program (EFNEP). The objectives for this study were: 1) Increase consumption of fruits and vegetables,

2) Increase consumption of healthy foods, 3) Decrease consumption of less healthy foods, 4) Increase participation in physical activity. The study design involved pre-test, educational intervention and post-test. Pre-tests were conducted during March, 2010. The intervention was conducted following the pre-test and lasted for 6 weeks. There were two post-test data collections. The first post-test measurement occurred immediately following completion of the intervention (May, 2010), and the second 6 months after the completion of the intervention (November, 2010). One-on-one interviews were conducted in May, 2010, following the completion of the intervention.

IRB approval: All methods and procedures were approved by the University of Georgia Institutional Review Board on Human Subjects.

Power Analysis: Online power analysis tools were used to retroactively estimate power (alpha = 0.05, n =23, one-tail test). From previous research in similar populations (based on age), it is estimated that at pre-test total fruit and vegetable intake will be 18.5 ± 0.73 servings per week (mean ± SD) (Caldwell et al 2008). A sample size of n = 23 (unpaired) provides a power of 100% to detect an increase of 3.5 servings per week between baseline and the first post-intervention data collection (DSS Research, 2009).

Power analysis is not applicable to qualitative data collection. Instead data was collected until saturation was reached.

Participants: Intervention participants were both males and females and included, Asian, Hispanic and African American youth aged 5-16 years. Of the possible 110 participants, 60 turned in parental consent and assent forms and completed baseline measurements (wave 1). Of these 60 youth all 60 participated in the first post intervention data collection (wave 2), but only 27 participated in the final data collection (wave 3). Twenty-three participants completed the

'My Food Choices' tool and the 'My Physical Activities' tool all 3 times data were collected. Participants were recruited from youth attending after-school programs sponsored by the Center for Pan Asian Community Services (CPACS) of Doraville, Georgia. The after-school programs from which participants were recruited are conducted at 6 locations in metro Atlanta and its surrounding areas. Data presented were from 4 (sites 3, 4, 5, and 6) of the 6 sites as no consent forms were returned from site 1 and the after-school program run at site 2 was cancelled before the conclusion of the study.

Interview participants were parents of youth participating in the intervention. Ten parents were interviewed. All interview participants were female (no males volunteered). The CPACS program coordinator was also interviewed.

Demographic information: Birth date was self-reported by participants. Not all participants knew their exact birth date, in which case age was reported. Gender and race were self-reported by intervention and interview participants.

Dietary assessment: Dietary intake was assessed using the 'My Food Choices' questionnaire (Gibson 2004). This questionnaire asked the participant to indicate how many times he/she consumed a particular food in the past week. Response options included Never, 1, 2, 3, 4, 5, 6, 7 or more. There are 58 items on the 'My Food Choices' questionnaire. The last 4 items of the questionnaire were culturally specific to Asian or Hispanic participants (African American participants completed the Hispanic questionnaire as well). However, the last 4 items were not included in data analysis presented below as the culturally specific items did not fall into the same food categories. When included in analysis these items did not affect the results. Pictures were included with each item. Participants completed the 'My Food Choices' questionnaire at

baseline and both follow-up data collections. Questions and answers were read aloud to participants who had trouble reading and translators were available when necessary.

Physical activity assessment: Physical activity was assessed using the 'My Physical Activities' questionnaire (Gibson 2004). This questionnaire consists of 22 activities. Participants were asked to indicate how many times in the last week they participated in each activity. Response options included Never, 1, 2, 3, 4, 5, 6, 7 or more. Participants completed the 'My Physical Activities' questionnaire at baseline and both follow-up data collections. Pictures were included with each question. Questions and answers were read aloud to participants who had trouble reading and translators were available when necessary.

Anthropometrics: Height was measured to the nearest ¼ inch using a stadiometer and weight was measured to the nearest 1/10 pound using a floor scale. Height and weight were measured at baseline and both follow-up data collections. Height was converted from inches to meters and weight from pounds to kilograms in order to calculate BMI and BMI percentile. BMI percentiles were based on the CDC Clinical Growth Charts (2000).

Curriculum: The curriculum used was *Food Talk* from the University of Georgia's EFNEP with adaptations made for a youth audience (Hanula 2008). Researchers and University of Georgia Cooperative Extension Service agents worked closely with CPACS staff to ensure age and cultural appropriateness of the curriculum. Lesson 1 included an introduction to the *Food Talk* program and assessed factors influencing dietary choices of the participants. Lesson 1 also addressed the importance of family meals and offered ways in which participants could be involved in meal planning and preparation. Lesson 2 focused on the importance of consuming fruits and vegetables, including how fruits and vegetables can affect health. Lesson 3 was designed to help participants make healthier choices when eating out, especially at fast food

restaurants. For example, participants are encouraged to choose the fruit or vegetable side and milk or water instead of soda. Lesson 4 focused on the importance of physical activity. Lesson 5 taught participants about food safety. Example topics included: proper hand washing and safe food handling, based on the *Fight Bac Children's Guide to Keeping Food Safe*. The final lesson was designed to allow participants to apply information from previous lessons. Participants were put into teams and played "Keep Your Health Out of Jeopardy". Topics from the previous 5 lessons were included. Each of the six lessons also included a hands-on food demonstration. Lessons were held once a week for six weeks. However, the intervention spanned 7 weeks as the after-school programs were not held during the week of spring break. Each site was assigned to a specific day of the week and each lesson occurred on the same day of the week for the entirety of the intervention. Lessons were approximately 1 hour in length (including the food demonstration) and were all taught by the same CPACS staff member.

Statistics: Descriptive statistics including means, standard deviations and percentages were calculated (SAS, Version 9.1, Cary, NC). Food items were categorized into the variables 'Fruit', 'Vegetable', 'Healthy' and 'Unhealthy' for analysis. There were 9 foods making up the 'Fruit' variable, 11 foods making up the 'Vegetable' variable, 30 foods making up the 'Healthy' variable and 24 foods making up the 'Unhealthy' variable. 'Healthy' and 'Unhealthy' categories were based on fat content. Activity items were categorized as 'Physical Activity' and 'Sedentary Activities' for analysis. There were 17 activities making up the 'Physical Activity' variable and 5 making up the 'Sedentary Activities' variable. Data were summed across participants and ANOVA was used to determine changes in dietary and physical activity behaviors and BMI percentiles between baseline and follow-up data. Regression analyses was used to identify any independent variables (eg, gender, race) significantly associated with the dependent variables

(dietary intake, physical activity, BMI percentile). Previous research has indicated that gender and race may be determinants of dietary and physical activity behaviors (Neumark-Sztanier et al 1999; O'Dea 2003; Satia-Abouta et al 2002; Yang et al 2007). Nationally representative data also indicates that Hispanic and African American youth are at increased risk of overweight and obesity compared to non-Hispanic whites, while Asian youth are at a decreased risk (Hedley et al 2004; Yajnik 2004; Yoon and Kim 2006). The alpha level was set a priori at $P < 0.05$.

Interviews: All interviews were audio-recorded and detailed notes were taken. Interviews were conducted at the participant's home or in a private room at the CPACS main office. A researcher from UGA was present for all interviews. Translators provided by CPACS conducted all but 1 parent interview and the interview with the CPACS program coordinator. Participants were asked questions from a question guide created by UGA researchers. Examples of question topics include: diet and physical activity patterns of household children, barriers to consuming a healthy diet and participating in physical activity and program satisfaction. Interviews were transcribed into Microsoft Word and then exported into MAXqda10. Once data were entered into MAXqda10 data were read through to identify recurrent themes. Based on these themes descriptive codes were created. Reliability was assessed using intra-coder agreement. The data were imported into MAXqda10 in 2 separate documents and coded by the researcher on separate occasions. The codes were then exported into Microsoft Excel and agreement was calculated. Any discrepancies were analyzed and resolved.

Results

Participants: Of those who completed all three sets of data collection, 8.7% were African American, 47.8% were Hispanic and 43.5% were Asian. Breakdown of race by site is presented

in Table 3.1. The gender make-up was 47.8% male and 52.2% female. Participants were aged 5-16 years. Age and BMI percentile by wave are listed in Table 3.2.

Table 3.1: Race by Site

	Site 3	**Site 4**	**Site 5**	**Site 6**
	%	%	%	%
African American	0	0	0	33.33
Hispanic	100	0	20	33.33
Asian	0	100	80	33.33

Table 3.2: Participant Age and BMI Percentile by Wave

	Wave 1	**Wave 2**	**Wave 3**
Average Age	9.3	9.5	9.9
Age	*N*=	*N*=	*N*=
5-10	12	11	11
11-16	11	12	12
Average BMI Percentile	67.1	68.1	67.4
BMI Percentile	*N*=	*N*=	*N*=
<5	1	0	0
5-<85	12	14	13
85-<95	4	4	4
≥95	6	5	6

'*Fruit' Intake:* There was an overall increase in 'Fruit' consumption, although this increase was not statistically significant. Site 3 increased consumption between waves 1 and 2. Consumption decreased slightly between waves 2 and 3, however consumption at wave 3 was still greater than consumption at wave 1. Participants from site 4 reported a decrease in consumption between waves 1 and 2, but an increase between waves 2 and 3 and waves 1 and 3. 'Fruit' consumption decreased overall for participants at site 5. Decreases were reported between each wave. Participants at site 6 also reported an overall decrease in 'Fruit' consumption. A summary of results by site and wave is presented in Figure 3.1.

Although none of the changes in 'Fruit' consumption were significant, there were several factors that were significantly associated with consumption. Site was significantly associated

(p=0.005) with site 3 consuming significantly higher amounts of 'Fruit' than the other sites. BMI percentile was also significantly (p=0.005) associated with 'Fruit' consumption. As BMI percentile increased 'Fruit' consumption decreased.

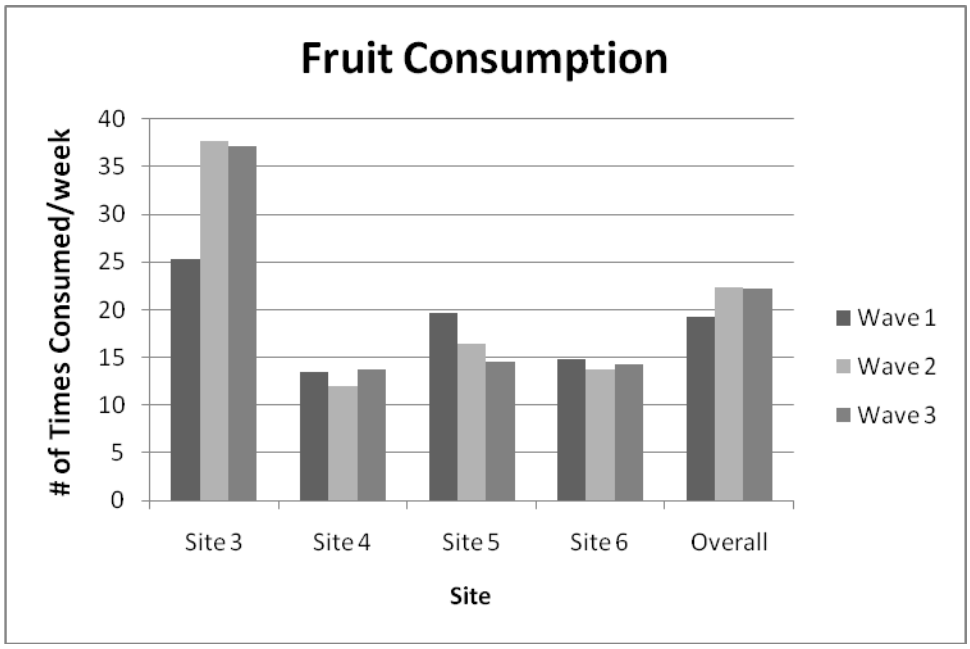

Figure 3.1: Fruit Consumption by Site. Consumption is measured in number of times per week. The variable 'Fruit' is a sum of 9 food items from the 'My Food Choices' questionnaire. Totals for each of the 3 waves of data collection are presented by site.

'*Vegetable' Intake:* There was an overall increase in 'Vegetable' consumption, but this increase was not statistically significant. Site 3 participants reported increased consumption between each wave. Site 4 also reported an overall increase in the consumption of vegetables. Consumption decreased between waves 2 and 3, however consumption at wave 3 was still greater than consumption at wave 1. Participants from site 5 reported an increase in consumption between waves 1 and 2 and a decrease in consumption between waves 2 and 3. Consumption at wave 3 was greater than consumption at wave 1. Participants at site 6 reported an overall decrease in 'Vegetable' consumption. Consumption increased between waves 1 and 2

but decreased between waves 2 and 3 with that reported for wave 3 slightly less than wave 1. Figure 3.2 presents a summary of results by site and wave.

None of the changes in 'Vegetable' consumption were statistically significant. There were however, several factors that were significantly associated with consumption. As with 'Fruit' consumption, site was significantly associated (p=0.021) with site 3 consuming significantly higher amounts of vegetables than the other sites. Again as with 'Fruit' consumption, BMI percentile was significantly negatively associated (p=<0.001) with 'Vegetable' consumption.

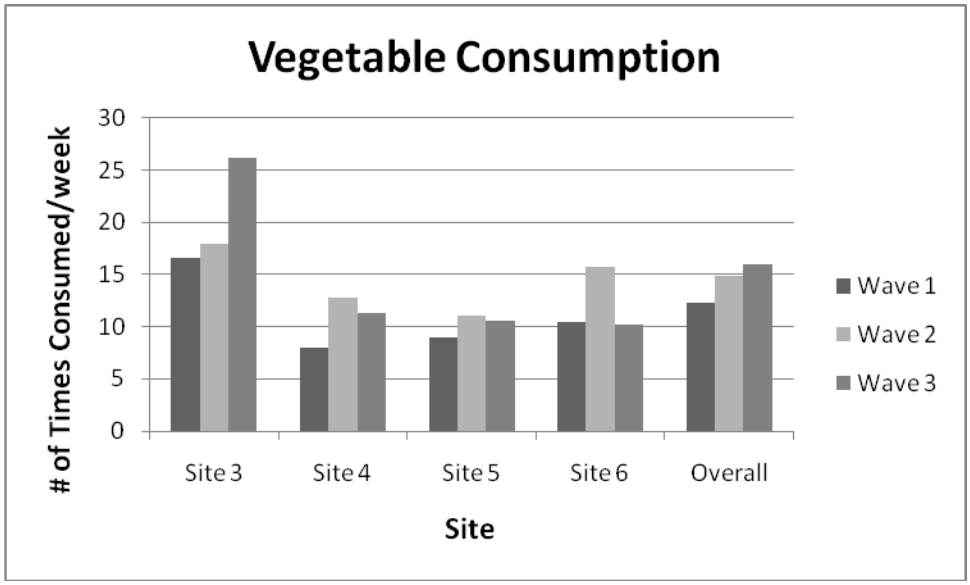

Figure 3.2: Vegetable Consumption by Site. Consumption is measured in number of times per week. The variable vegetable is a sum of 13 food items from the 'My Food Choices' questionnaire. Totals for each of the 3 waves of data collection are presented by site.

'Healthy' Food Intake: Consumption of 'Healthy' foods increased overall, but not at a statistically significant level. Increases were reported at each wave by participants at sites 3 and 4. Decreases were reported at each wave by participants at site 5. Site 6 participants reported an increase between waves 1 and 2 but a decrease between waves 2 and 3, which resulted in an overall decrease in consumption of 'Healthy' foods. See Figure 3.3 for a summary of results by site and wave.

None of the increases or decreases in consumption of 'Healthy' foods were statistically significant, but several factors were significantly associated with consumption. Site 3 consumed significantly (p=<0.001) more 'Healthy' foods than the other sites while site 4 consumed significantly (p=0.04) fewer. Also, BMI percentile was negatively significantly associated (p=0<.0001) with consumption.

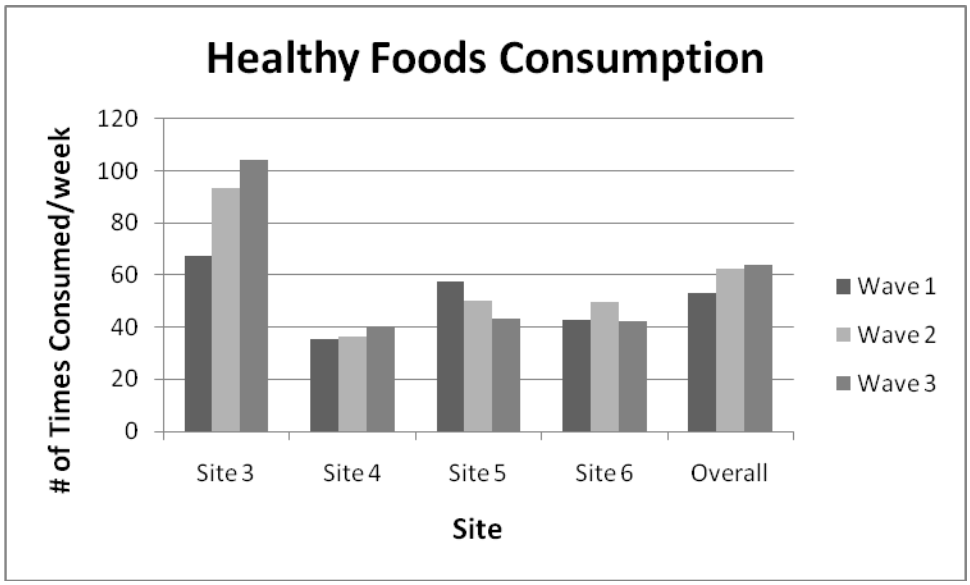

Figure 3.3: Healthy Foods Consumption by Site. Consumption is measured in number of times per week. The variable healthy is a sum of 30 food items from the 'My Food Choices' questionnaire. Totals for each of the 3 waves of data collection are presented by site.

'*Unhealthy' Food Intake:* Similar results were found for consumption of 'Unhealthy' foods as was found for 'Healthy' foods. Overall consumption of 'Unhealthy" foods increased, although this was not a statistically significant increase. Increases were reported at each wave by participants at site 3. An overall increase in consumption of 'Unhealthy' foods was reported by site 4, although there was a decrease between waves 2 and 3. Decreases were reported at each wave by participants at sites 5 and 6. A summary of changes in consumption of 'Unhealthy' foods according to site and wave is presented in Figure 3.4.

As with ‘Fruit’, ‘Vegetable’ and ‘Healthy’ foods, none of the increases or decreases in consumption of ‘Unhealthy’ foods were statistically significant. Even so, there were factors that were significantly associated with consumption. Site 3 consumed significantly (p=0.003) more ‘Unhealthy’ foods than the other sites while site 4 consumed significantly (p=0.04) fewer. Again, BMI percentile was significantly negatively associated (p=0.005) with consumption.

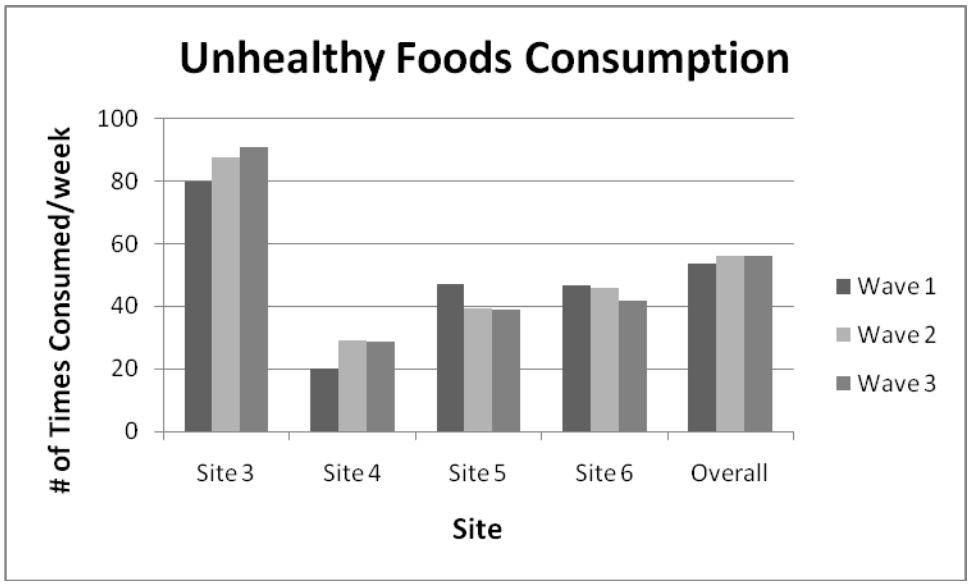

Figure 3.4: Unhealthy Foods Consumption by Site. Consumption is measured in number of times per week. The variable unhealthy is a sum of 24 food items from the ‘My Food Choices’ questionnaire. Totals for each of the 3 waves of data collection are presented by site.

‘*Physical Activity’:* Overall participants reported a decrease in participation in ‘Physical Activity’, although this decrease was not statistically significant. Site 3 participants reported increases in participation in ‘Physical Activity’ between waves 1 and 2 and waves 2 and 3, with an overall increase. Participants at site 4 also reported an overall increase in participation. While there was a decrease between waves 2 and 3 participation reported at wave 3 was greater than participation reported at wave 1. Participants at sites 5 and 6 both reported an overall decrease in participation in ‘Physical Activity’. Participation decreased between waves 1 and 2 but then increased between waves 2 and 3. However, participation at wave 3 was still less than

that reported for wave 1. Participation in 'Physical Activity' by site and wave is presented in Figure 3.5.

Regression analyses indicated that although there were no significant changes in participation in 'Physical Activity', site and BMI percentile were significantly associated with participation. Site 3 participated in significantly (p=0<.0001) more 'Physical Activity' than the other sites, while site 4 participated in significantly (p=0.002) less. BMI percentile was significantly negatively (p=0<.0001) associated.

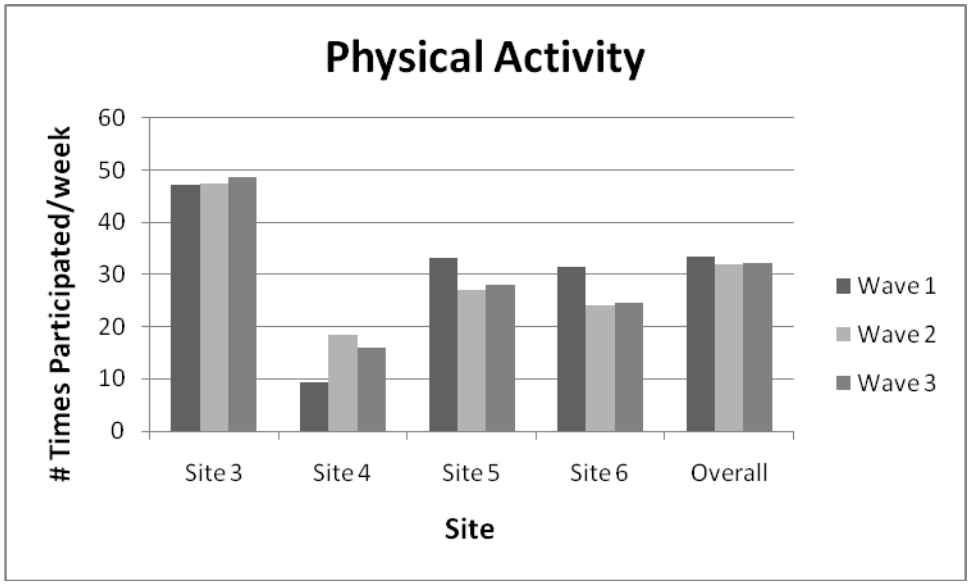

Figure 3.5: Participation in Physical Activity by Site. Participation is measured in number of times per week. The variable high level is a sum of 17 activity items from the 'My Physical Activities' questionnaire. Totals for each of the 3 waves of data collection are presented by site.

'*Sedentary Activities':* Although not significant, participants reported an overall increase in participation in 'Sedentary Activities'. Participants at sites 3 and 6 reported a decrease in 'Sedentary Activities' between waves 1 and 2 with an increase between waves 2 and 3. Participation at wave 3 was also greater than that reported for wave 1. Site 4 participants reported increases in participation between waves 1 and 2 and waves 2 and 3, with an overall increase in participation in 'Sedentary Activities'. Participants at site 5 were the only

participants to report an overall decrease in participation. Data indicate a slight increase between waves 2 and 3, but participation at wave 3 was still lower than that at wave 1. Figure 3.6 presents a summary of participation in sedentary activities by wave.

As was observed with participation in 'Physical Activity', site 3 participants reported participating in significantly (p=<0.001) more 'Sedentary Activities' than the other sites. Site 4 participated in significantly (p=0.003) fewer. BMI percentile was negatively significantly (p=0.015) associated with participation and age was positively significantly (p=0.013) associated.

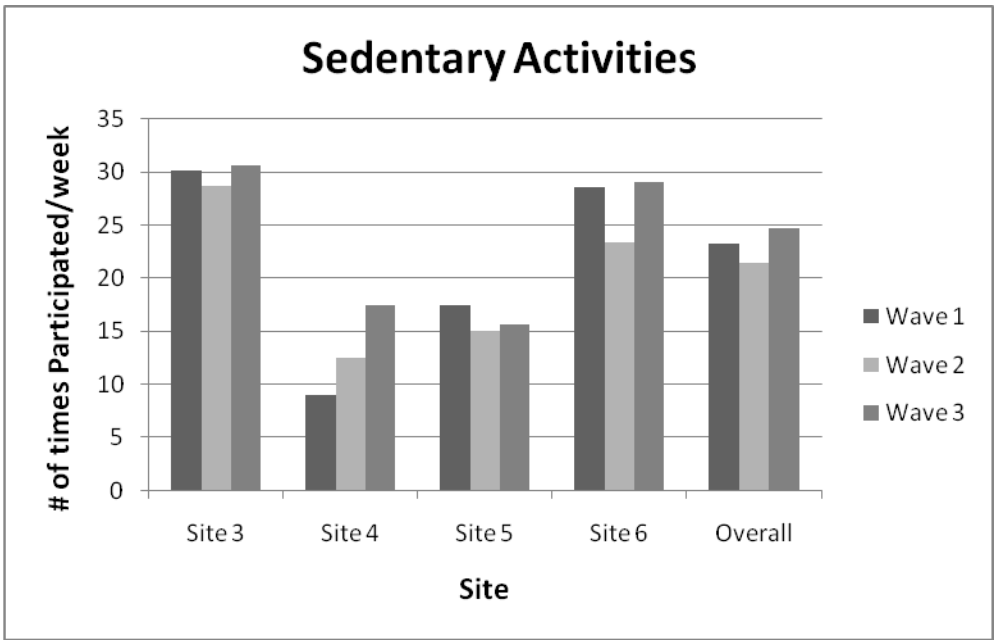

Figure 3.6: Participation in Sedentary Activities by Site. Participation is measured in number of times per week. The variable high level is a sum of 5 activity items from the 'My Physical Activities' questionnaire. Totals for each of the 3 waves of data collection are presented by site.

BMI Percentile: There were no significant changes in BMI percentile overall or across sites. Average BMI percentile increased between waves 1 and 2 and decreased between waves 2 and 3 with an overall increase between waves 1 and 3. Despite the increases, the average BMI percentile for participants remained within the normal range.

Interviews: Data collected through parent interviews indicates that money is a barrier to accessing healthier foods. Parents lacked money not only to purchase the foods, but money for transportation to grocery stores. Several parents indicated that their children are picky eaters, so they base their meals on what their children will eat, not necessarily what is healthy. Although self-reported data do not indicate significant changes in eating behaviors, parents and CPACS staff did observe an increased willingness of the participants to try new foods. Additionally, several parents reported that their children were more aware of which foods are healthy versus unhealthy, and were even reading nutrition labels and ingredient lists. All parents that were interviewed felt their children were physically active. Several parents indicated that safety was a concern with respect to neighborhood parks, but still felt their children had opportunities to participate in physical activity. The most common suggestion for improving the intervention was to include classes for parents. CPACS staff indicated similar concerns as parents did for the barriers to eating healthy in this community. The need for more programs like this was emphasized, as was the need for more resources (both money and staff) when conducting these programs.

Discussion

Although changes in diet and physical activity behaviors were not achieved at a statistically significant level, results of this study did elucidate factors that were significantly associated with these behaviors. Participants at site 3 reported consuming significantly more of each food variable and participating in significantly more 'Physical Activity' and 'Sedentary Activities' than the other sites. Additionally, participants at site 4 reported consuming significantly fewer 'Healthy' and 'Unhealthy' foods and participating in significantly less 'Physical 'Activity' and

'Sedentary Activities' than other sites. This is of interest as all participants at site 3 were Hispanic and all participants at site 4 were Asian. This suggests that although the race variable was not significantly associated with dietary and physical activity patterns race may be mediating behaviors through unmeasured factors. One such factor may be income. Family income was not directly measured but through observations and discussions with CPACS staff it became apparent that participants at site 4 came from lower income families than participants at other sites. Lack of income commonly limits access to foods in general, particularly healthy foods such as fruits and vegetables. Many participants from site 4 stopped participating in the afterschool program due to violence within the community. This may be one reason these participants reported participating in fewer physical activities than participants from other sites. Most of the physical activities from the 'My Physical Activities' questionnaire are outdoor activities. If the community is not safe parents will not allow their children to spend time outdoors.

There were also differences in average age by site. Participants at site 6 were all in middle school, while most participants at the other three sites were in elementary school. Physical activity outside of school can decrease with age as recess is no longer a part of the school day and students spend more time in sedentary activities as the demands of school increase. Although not significant, age was negatively associated with 'Fruit' and 'Healthy' food intake and positively associated with 'Unhealthy' food intake. Age was significantly positively associated with participation in 'Sedentary Activities' and negatively (not significant) associated with participation in 'Physical Activity'.

Due, in part, to the relatively short time period over which data were collected and age of the participants it is not surprising that there were no significant changes in BMI percentile.

Additionally, weight loss was not a specific aim for this study. Height and weight were collected to initiate a tracking system for CPACS in order to monitor changes over longer periods of time. Participants in the after-school programs often participate throughout elementary, middle and high school, which would allow CPACS to track height and weight over multiple years.

The most common suggestion given by parents to improve the program was to add a parent component. Based on interview data, parents are purchasing the household foods and therefore making the decisions as to what foods are available for consumption. Thus, including parents in the program may increase the likelihood of behavior change among youth.

Lastly, the intervention was only 6 weeks in length. While it is important not to overwhelm youth with information, 6 weeks is likely not enough time to affect significant behavior change. Increased duration and follow-up to reinforce behaviors may increase the success of the intervention in terms of statistically significant changes in dietary and physical activity patterns (Roseman et al 2011).

Conclusions

Although the important roles that diet and physical activity play in the prevention of overweight and obesity are well accepted, data indicate that the majority of U.S. youth do not follow dietary or physical activity recommendations (Centers for Disease Control, 2009). As the rates of overweight and obesity continue to rise among youth it is imperative that effective interventions be created and implemented to combat this epidemic. Common co-morbidities of overweight and obesity are often higher in racial/ethnic minorities, yet these populations are often overlooked. Refugee and immigrant populations have grown dramatically over the past

several decades making these important target populations for nutrition and physical activity interventions (Satia-Abouta et al 2002).

Not all of the intervention goals were achieved. However, results of this study do indicate that community-based nutrition and physical activity interventions can improve dietary and physical activity patterns of youth from immigrant and refugee families. Although not statistically significant, changes were observed in the expected direction for 'Fruit', 'Vegetable' and 'Healthy' foods overall. Additionally, while overall the changes in consumption of 'Unhealthy' foods, 'Physical Activity' and 'Sedentary Activities' were not in the expected direction, several of the sites did report changes in the desired direction.

Each of the sites received the same intervention delivered by the same CPACS staff member, which suggests that there are factors outside the intervention content and delivery that are influencing dietary and physical activity patterns. Based on regression analyses it appears that site, BMI percentile and age are all influential. One might not expect site to be a significant factor since the intervention was the same at each site. However, the 2 sites that were significantly associated with the measured behaviors were each comprised of participants of only 1 race. Participants at site 3, who consumed significantly more foods and participated in significantly more activities, were all Hispanic, while those at site 4, who consumed significantly fewer 'Healthy' foods and participated in significantly fewer activities, were all Asian. Race was included in the regression analyses and was not significantly associated with the behaviors across the sites. This suggests that there may be an unmeasured factor that may or may not be associated with race that is influencing behavior patterns. Our finding that BMI percentile is negatively associated with consumption of 'Fruit', 'Vegetable' and 'Healthy' foods and with 'Physical Activity' is not surprising and is supported by the literature. It is also reasonable to

expect that age is associated with increased participation in 'Sedentary Activities'. As youth get older there are fewer opportunities to participate in physical activities during school hours and increased demands to participate in 'Sedentary Activities' such as reading and using the computer for school purposes.

There are several limitations of this evaluation. First and foremost is the loss to follow-up. Over 60% of participants were lost between baseline and wave 3 of data collection. There were multiple reasons for loss to follow-up. One of the 6 sites (site 2) was cancelled before the conclusion of the study so participants of this site were not available for wave 3 data collection. Many participants from site 4 stopped participating in the after-school program due to violence in the community and were therefore not available for wave 3 data collection. Lastly, some participants were lost to follow-up because their families moved or they chose to stop participating in the after-school program. Time was also a limitation for this intervention. Because the intervention and data collection took place during an after-school program researchers only had until the end of the spring semester to obtain approval from the IRB, obtain consent and assent, collect wave 1 data, implement the intervention and collect wave 2 data. Thus, time allotted for the intervention was minimal. The previous semester was utilized for developing a community-academic partnership between CPACS and UGA, outlining study priorities and modifying the intervention curriculum and measurement tools. Another limitation may have been that parents were not included in the intervention. Most of the participants are young enough that they rely on their parents for purchasing and preparing their meals. Thus, future studies may benefit from including intervention materials for parents.

There were also several strengths of this study. First, the same intervention was delivered to all participants by the same CPACS staff member, thus increasing consistency and allowing for

comparisons between sites. The questionnaires used to measure dietary intake and physical activity have been extensively tested among young children and have been shown to be reliable indicators of food consumption and physical activity (Gibson 2004). Additionally, UGA researchers were present for all data collection, which ensured that proper protocols were used for each wave of data collection.

Program evaluation is an important component of community-based research as it can provide assessments of worth based on objective and subjective data. Evaluation also provides feedback on effective aspects of the program and underlying factors that may be influencing program results. This is imperative for the creation of truly effective programs aiming to prevent childhood overweight and obesity. Study findings suggest that CBPR has the potential to positively impact dietary and physical activity behaviors among youth from immigrant and refugee families. Future research is needed to elucidate techniques for addressing audiences of racial/ethnic minorities.

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Chapter 4

FAMILY FOOD AND FITNESS FUN PACK: PILOT STUDY OF A SCHOOL-BASED NUTRITION AND PHYSICAL ACTIVITY PROGRAM FOR STUDENTS AND THEIR FAMILIES[1]

[1]Seaver O, Mullis RM, Bason J, Davis M, Hanula G, Lewis R. To be submitted to the Journal of Nutrition Education and Behavior.

Abstract

Objective: 1) Increase consumption of fruits and vegetables, 2) Increase participation in physical activity, 3) Increase nutrition and physical activity related knowledge, 4) Compare changes in behavior and knowledge between those who kept the FFFFP and those who used the FFFFP for 1 week.

Design: This is a program evaluation of a school-based educational intervention targeting 3rd and 4th grade students and their parents. The study design involved pre-test, intervention, and post-test.

Setting: Fifteen classrooms in 6 elementary schools throughout Georgia.

Sample: Participants were elementary school students in the 3rd and 4th grades and their parents. One hundred and twenty students and 79 parents completed baseline and follow-up questionnaires.

Main Outcome Measures: Consumption of fruits and vegetables, participation in physical activity and dietary and physical activity knowledge.

Analysis: Descriptive statistics including means, standard deviations and percentages were calculated. Paired t-tests were used to determine changes from baseline to follow-up. Regression analyses were used to identify any independent variables significantly associated with the dependent variables.

Results: Students reported a significant increase in physical activity at school and outside school and a significant decrease in screen time. Students also reported a significant decrease in fruit consumption. Scores for physical activity knowledge increased but decreased for nutrition knowledge. Gender and school were significantly associated with several of the dependent variables.

Parents reported significant increases in physical activity and physical activity with their child/children. Although not statistically significant, the number of times parents served fruits and vegetables increased. Both physical activity knowledge and nutrition knowledge increased following the intervention. There were significant increases in the frequency of reading nutrient labels and the number of nutrients parents considered when purchasing a food item. Age, level of education and whether the FFFFP was kept or rotated were significantly associated with findings.

Conclusions and Implications: Results of this study indicate that the FFFFP program can improve dietary and physical activity patterns among elementary school children and their parents. Evaluation of this pilot program identified the need for increased training among teachers and necessary changes for the measurement tools.

Introduction

The environment in which we live is often referred to as obesogenic. That is, the environment promotes excess food consumption and hinders participation in physical activity (Proctor et al 2008). Nationally representative data indicate that the majority of U.S. adolescents are not following dietary or physical activity recommendations (Centers for Disease Control 2009). In a sample of over 2,000 adolescents greater than 80% reported eating snacks between meals that consisted primarily of processed foods and fast foods (Jenkins and Horner 2005). Another sample of more than 3,000 adolescents revealed that consumption of fats and added sugars constituted 40% of total energy intake among adolescents (Jenkins and Horner 2005). In addition, those meeting physical activity recommendations have decreased by almost half from 2007 to 2009 (Centers for Disease Control and Prevention 2008; Centers for Disease Control and Prevention 2009). This decrease in physical activity may not be surprising if we consider that approximately 26% of U.S. children watch more than four hours of television per day and 62% watch at least two hours (Selassie and Singh 2011).

Inadequate diet and physical activity are commonly linked to negative physical health outcomes and recent studies indicate that these may also affect a child's ability to learn (Belot and James 2011). Poor diet has been associated with decreased academic and behavioral performance in school (Pollitt 1995; Powell et al 1998). Eating breakfast may improve cognitive functioning such as memory and test grades, and even school attendance (Rampersaud et al 2005). Participation in group physical activity has been found to help youth develop social skills, improve mental health and decrease participation in risky behaviors (Story et al 2006). This suggests that programs to improve nutrition and increase physical activity of youth may

improve the academic performance of all children while also reducing the risk of obesity (Story et al 2006).

Schools are in a exclusive position to play a critical role in promoting healthy lifestyle choices and aiding in the prevention of childhood obesity (Belansky et al 2010; Ellis et al 2005). Reaching more than 95% of all U.S. children aged 5-17 years and having more continuous and intensive contact with youth during the first two decades of their lives than any other institution, schools have the potential to play an important role in the behavioral choices of youth (Roseman et al 2011; Story et al 2006). Because of this, schools have been the setting of choice for most randomized obesity prevention trials (Han et al 2010). Several school-based nutrition and physical activity intrerventions have been successful. Howerton et al (2007) reviewed seven school-based nutrition programs that aimed to increase fruit and vegetable consumption among participants. Of these seven programs, six saw a statistically significant increase in fruit and vegetable consumption (Howerton et al 2007). The "High 5" project, conducted in elementary schools, saw a statistically significant increase in consumption of fruits and vegetables for both children and parents in the intervention group (Reynolds et al 2000). There were also significant increases in nutrition related knowledge such as the food guide pyramid and the 5 A Day recommendations (Reynolds et al 2000).

A review of school-based interventions found several common methods utilized by interventions that achieved positive statitically significant results and based on these methods offered suggestions for future interventions (Roseman et al 2011). Several of these suggestions include: 1)Nutrition interventions should be behaviorally focused, 2) Interventions should include multiple components (e.g., family norms, knowledge, access to healthful food options),

3) Family involvement enhances the effectiveness of school-based programs, 4) Nutrition education should be sequential, with sufficient duration and intensity (Roseman et al 2011).

One of the techniques of successful interventions, as listed above, is the inclusion of families. Dietary behaviors are affected by opportunities to share family meals, by the amount and time spent watching television, by a parent's child-feeding methods, by a mother's knowledge of nutrition, by a child's exposure to food, and by parental role-modeling (Ellis et al 2005; Rhee 2008). Studies indicate that adolescents who ate dinner with their families every day consumed 0.8 more servings of fruits and vegetables than adolescent who reported never or rarely eating dinner with their familiy (Jenkins and Horner 2005). Adolescents who ate dinner with their family also consumed lower amounts of saturated and trans fats (Jenkins and Horner 2005). The frequency of family meals decreases with adolescence, which is of concern as adolescents report associating eating healthy foods with eating family meals (Jenkins and Horner, 2005). Frequency of family meals was the most influential parental factor for dietary choices (Videon and Manning 2003). Due to the influential role parents play in the dietary choices and food preferences of children it is essential that parents be targeted with nutrition interventions as well to provide them with the knowledge and skills to make healthy choices not only for their children but for themselves (Hoerr et al 2005; Matheson et al 2002; Rhee 2008). The FFFFP offers a creative and unique way to reach families with nutrition and physical activity education along with opportunities to improve dietary and physical activity behaviors.

Methods

Study Design: This is a program evaluation of a school-based educational intervention targeting 3rd and 4th grade students and their parents. The intervention included a backpack

containing 6 activities aimed at improving dietary and physical activity behaviors and knowledge among participants. Fifteen classrooms from 6 elementary schools throughout the state of Georgia participated in the program. Study objectives included: 1) Increase consumption of fruits and vegetables among student and parent participants, 2) Increase participation in physical activity among student and parent participants, 3) Increase nutrition and physical activity related knowledge among student and parent participants, and 4) Compare changes in behavior and knowledge between those who kept the FFFFP and those who used the FFFFP for 1 week. The study design involved pre-test, intervention, and post-test. Pre-tests were conducted during February, 2011. The intervention was conducted following the pre-test. There were two intervention doses, which differed by school. Classrooms in 2 of the schools were given FFFFPs for each participating student to take home and keep. Students and their families (n = 56) were able to keep the FFFFP even after the completion of the intervention. Post-test data was collected 7 weeks after the FFFFPs were distributed. Classrooms in the remaining 4 schools were each given 5 FFFFPs to distribute to participants. Students and their families (n = 102) were able to keep the FFFFP for 1 week. Any missing materials were replaced before giving the FFFFP to the next student. All students and parents took the pre-test at the same time. However, post-tests were taken 7 weeks after students were given the FFFFP.

IRB approval: All methods and procedures were approved by the University of Georgia Institutional Review Board on Human Subjects.

Power Analysis: Online power analysis tools were used to retroactively estimate power (alpha = 0.05, n =120, one-tail test). From previous research in similar populations (based on age), it is estimated that at pre-test total fruit and vegetable intake will be 3.0 ± 0.8 servings per day (mean ± SD) for the student participants (Robinson-O'Brien et al 2009). A sample size of n

= 120 (paired) provides a power of 100% to detect an increase of 0.5 or 1.0 daily servings between baseline and the post-intervention data collection (DSS Research 2010). Power was also estimated for the parent population (alpha = 0.05, *n* =79, one-tail test). Nationally representative data indicates that the average fruit and vegetable intake among U.S. adults is 3.04 ±0.06 servings per day (Casagrande et al 2007). A sample size of *n* = 79 (paired) provides a power of 100% to detect an increase of 0.5 or 1.0 servings between baseline and post-intervention data collection (DSS Research 2010).

Participants: Intervention participants were elementary school students in the third and fourth grades and their parents. Participants were recruited from 15 classrooms at 6 elementary schools throughout the state of Georgia. Two of the elementary schools were in Newton county, 2 in Valdosta county, 1 in Spalding county and 1 in Wilcox county. One hundred and fifty eight students and 157 parents turned in parental consent forms and completed baseline questionnaires. Of those who turned in baseline questionnaires, 120 students and 79 parents completed follow-up questionnaires. Gender and grade were self-reported by students. Age (given as a range) and highest level of education were self-reported by parents.

Assessment: Students completed an 11 item questionnaire at baseline to assess fruit and vegetable intake, physical activity at school and outside of school, knowledge of dietary and physical activity recommendations, and time spent watching television/playing video and computer games (screen time). Follow-up questionnaires included the 11 questions from the baseline questionnaire along with 3 additional questions to assess satisfaction with the FFFFP. Students were also given calendars and asked each morning to write in any FFFFP activities they participated in the night before. All questionnaires and calendars were completed during school

hours. Teachers were asked to read each question and the answer choices to the students as they completed the questionnaires.

Parents completed a 15 item questionnaire at baseline to assess physical activity, physical activity of the student, feeding practices, knowledge of dietary and physical activity recommendations for children and adults, and factors affecting food purchasing. Follow-up questionnaires contained the 15 questions from the baseline questionnaire as well as 8 questions relating to use of and satisfaction with the FFFFP. Baseline questionnaires were sent home with students along with a description of the program and consent forms. Parents were asked to return signed consent forms and a completed questionnaire if they agreed to participate in the program. Consent forms and questionnaires were returned to the child's teacher in a sealed envelope for confidentiality purposes. Parents had the option to give permission for their child to participate even if they themselves chose not to participate. Follow-up questionnaires were also sent home with the child and returned to the teacher in a sealed envelope. Small incentives such as pencils, re-usable lunch bags and water bottles, were offered to encourage children to return parent forms.

FFFFP: The FFFFP included a binder that contained 6 activities aimed at increasing consumption of fruits and vegetables, increasing participation in physical activity and increasing knowledge of dietary and physical activity recommendations. The 6 activities included were a workout DVD, "Raid the Pantry", "Commercial Competition", resistance bands, "Food Hunt", and "Health Bingo". "Raid the Pantry" asked students and parents to pick their three favorite snack food items and check the nutrient label for serving size and nutrients of interest (calories, total fat, sodium, sugars, trans fat). A picture of a nutrient label indicating where serving size and the nutrients of interest can be found was included along with an explanation of why it is

important to be aware of these. "Commercial Competition" encourages participants to engage in physical activity while watching television. Four activities (jogging in place, curl-ups, push-ups and flip-flops) are suggested for participants to engage in during commercial breaks. Descriptions of each are provided in the binder. Also included are forms for participants to keep track of how many of each exercise he/she completed. Resistance bands are included in the FFFFP as well. Five exercises (tricep extension, lunges, chest press, biceps, and adduction) are described in the binder for use with the resistance bands. Pictures are included, along with suggested number of repetitions for each exercise. The "Food Hunt" activity is designed to increase knowledge of the Food Guide Pyramid and to encourage participants to use this knowledge when making dietary choices. An image of the Food Guide Pyramid is included with an explanation of the information provided. Participants are encouraged to find foods they currently have in their home from each food group. The final activity in the FFFFP was "Health Bingo". Bingo sheets are included in the binder along with plastic chips to cover the spaces. The bingo sheets included pictures of fruits, vegetables and exercises.

In addition to the 6 activities the binder contained the "Loving your Family, Feeding their Future" booklet put together by the Supplemental Nutrition Assistance Program (SNAP). This booklet contained information on the Food Guide Pyramid, appropriate serving sizes and 7 "healthy habits" to help parents incorporate healthy dietary choices into daily life. Recipes to increase consumption of fruits, vegetables, calcium, whole grains and lean proteins were provided. To enhance utilization of this booklet, researchers suggested that participants try 1 "healthy habit" per week and included ways to utilize FFFFP activities when trying the habits. All participants were able to keep the SNAP booklet.

Statistics: Descriptive statistics including means, frequencies and percentages were calculated (SAS, Version 9.1, Cary, NC). Knowledge items were categorized into 'Physical Activity Knowledge' and 'Nutrition Knowledge'. For student participants there was 1 item making up the 'Physical Activity Knowledge' variable and for parents there were 2 items. The 'Nutrition Knowledge' variable was made up of 3 items for students and 4 items for parents. All other items were treated as individual variables. Data were summed across participants and paired t-tests were used to determine changes from baseline to follow-up. Regression analyses were used to identify any independent variables (eg, gender, education) significantly associated with the dependent variables. The alpha level was set a priori at $P < 0.05$.

Results

Demographics: Fifty-four percent of student participants were male and 46% female, 57% were in third grade and 43% in fourth. Participants were not equally distributed throughout the 6 schools. The majority of the participants attended school 1 (28.33%) followed by schools 5, 6, 2, 4 and 3 (25.83%, 23.33%, 8.33%, 7.5% and 6.67% respectively). There was also a difference in the proportion of participants who kept the back pack versus those who were on the rotating schedule (32.5% and 67.5% respectively).

Most parent participants indicated that they were 30-39 (55.69%), 24.05% were 40-49, 12.66% were 20-29, 5.06% were 50-59 and 2 (2.53%) participants did not report age. Parents were asked to indicate the highest level of education they have obtained from a list of 6 options. The frequency of each level of education is listed in Table 4.1. Results from baseline as well as follow-up are listed as there were notable discrepancies in reporting.

Table 4.1: Parent Education by Wave.

	Baseline		**Follow-up**	
Level Education	Number	Frequency	Number	Frequency
Some High School	5	6.33	10	12.66
High School	26	32.91	15	18.99
Some College	28	35.44	33	41.77
Associate's	4	5.06	5	6.33
Bachelor's	11	13.92	12	15.19
Graduate	5	6.33	3	3.8
Missing	0	0	1	1.27

Student Findings: Students reported increases in physical activity between baseline and follow-up. This increase was statistically significant for physical activity at school, but not for physical activity outside of school (Table 4.2). Over 90% of students reported that they go grocery shopping with their parents both at baseline and follow-up. There was a decrease in the number of times per week students cooked with their parents, but this was not statistically significant. Students indicated a decrease in consumption of both fruits and vegetables, with a statistically significant decrease for fruits. Following the intervention, students scored higher on their physical activity knowledge, but lower on their nutrition knowledge. Neither change in knowledge was statistically significant. The majority of students (27.5%) reported less than 1 hour of screen time per day both at baseline and following the intervention. However, there was a decrease in the number of students reporting 4 and 5 or more hours per day, resulting in an overall significant decrease in the number of hours of screen time (Table 4.2). Students indicated that they felt the FFFFP influenced their eating choices "some" and their participation in physical activity "a lot". Questionnaire data indicate that the 3 most popular FFFFP activities among students were "Health Bingo", resistance bands and the workout DVD. Most students did not complete the calendars. Those who did often did not fill them out completely or wrote in information not specifically pertaining to the FFFFP. The information collected via the

calendars indicates that the students participate in physical activity most days, but few actually wrote in activities from the FFFFP.

Table 4.2: Changes in Behaviors and Knowledge among Student Participants.

	Baseline	**Follow-up**	**P-value**
P.A. at school (# times per week)	2.72	2.96	0.04
P.A. outside school (# times per week)	3.07	3.12	0.69
Cooked w/parents (# times per week)	2.13	2.03	0.42
Fruit intake (# times per day)	3.7	3.34	0.01
Vegetable intake (# times per day)	2.67	2.65	0.92
P.A. knowledge (cumulative score)	0.65	0.69	0.37
Nutrition knowledge (cumulative score)	2.34	2.21	0.06
Screen time (hours)	3.69	3.29	0.04

Gender and school were significantly associated with some of the findings. Male participants reported cooking with their parents significantly fewer times per week than female participants (p=<0.001, r^2=0.06). Male participants also consumed significantly less fruit than females (p=0.007, r^2=0.05) and reported significantly more hours of screen time (p=0.03, r^2=0.02). Participants from school 2 consumed significantly more fruits (p=0.02, r^2=0.05) and vegetables (p=0.002, r^2=0.05) than students from other schools, but also scored significantly lower for physical activity knowledge (p=0.02, r^2=0.09). School 3 participants scored significantly higher for nutrition knowledge (p=0.04, r^2=0.01) than students from other schools, but reported participating in significantly less physical activity at school (p=0.03, r^2=0.04). Finally, participants from school 5 scored significantly higher for physical activity knowledge (p=0.02, r^2=0.09) than participants from other schools.

Parent Findings: Following the intervention parents reported participating in significantly more physical activity overall and significantly more physical activity with their child/children (Table 4.3). Parents also reported that their children were participating in significantly more physical activity both at school and outside of school. Approximately 78% of parents reported

taking their children grocery shopping prior to the intervention and 86% following the intervention. The number of times parents served fruits and vegetables to their children increased following the intervention, but this was not a significant increase. Both physical activity knowledge and nutrition knowledge increased following the intervention. Changes in knowledge were not statistically significant. There were however significant increases in the frequency of reading nutrition labels on food purchases and the number of nutrients parents considered when purchasing a food item (Table 4.3). Specifically, parents were significantly more likely to consider total fat, cholesterol and sodium. Parents were also more likely to consider calories, saturated fat, trans fat and sugar.

Table 4.3: Changes in Behavior and Knowledge among Parent Participants.

	Baseline	**Follow-up**	**P-value**
Exercise (# times per week)	2.09	2.51	<0.001
Exercise with children (# times per week)	1.75	2.19	<0.001
Child's P.A. at school (# times per week)	2.62	3.22	<0.001
Child's P.A. outside school (# times per week)	2.81	3.14	0.01
# times serve fruit (# per day)	1.79	2.01	0.06
# times serve vegetables (# per day)	1.89	2.14	0.09
P.A. knowledge (cumulative score)	1.14	1.22	0.35
Nutrition knowledge (cumulative score)	2.38	2.43	0.63
Read nutrition label (# items read)	3.24	3.54	0.004
Nutrients considered (# nutrients)	3.2	3.94	<0.001

Age, level of education and whether the FFFFP was kept or not were significantly associated with some of the results from the data provided by parents. Parents who reported being 30-39 exercised significantly more often than those in the other age groups (p=<0.001, r^2=0.11). These parents also reported exercising with their children (p<0.001, r^2=0.18) and serving fruit significantly more often (p=0.02, r^2=0.08). Those parents who reported being 50-59 indicated that their children participated in physical activity outside of school significantly less often than parents in the other age groups (p=0.005, r^2=0.09). Parents who listed high school as their

highest level of education exercised significantly less often (p=0.03, r^2=0.11), but reported that their children participated in physical activity at school significantly more often than parents with higher levels of education (p=0.04, r^2=0.12). Those with high school as their highest level of education also reported serving fruit to their children significantly less often (p=0.02, r^2=0.08), reading nutrient labels significantly less often (p=<0.001, r^2=0.07), considered significantly fewer nutrients when purchasing foods (p<0.001, r^2=0.1) and scored significantly lower for nutrition knowledge (p=0.004, r^2=0.05). Parents who reported graduate school as their highest level of education scored significantly lower on physical activity knowledge (p=0.05, r^2=0.02). Those who were able to keep the FFFFP reported that their children participate in significantly less physical activity outside of school compared to parents in the group that rotated the FFFFP (p=0.02, r^2=0.09). Additionally, parents in the group that kept the FFFFP reported serving fruit to their children significantly more often than those in the group that rotated the FFFFP (p=0.003, r^2=0.08).

Discussion

Although not all of the intervention goals were achieved, results of this study do indicate that school-based nutrition and physical activity interventions can improve dietary and physical activity behaviors among elementary school children and their parents. Student participants reported participating in significantly more physical activity following the intervention, but decreased consumption of fruits and vegetables. Students scored higher for physical activity knowledge following the intervention but lower for nutrition knowledge. Data also indicated a significant decrease in screen time following the intervention. Parent participants also reported significant increases in physical activity, both for themselves and for their children. The number

of times parents served fruits and vegetables per day also increased as did physical activity and nutrition knowledge, frequency of reading nutrition labels and the number of nutrients parents consider when making food purchases.

There were indicators that significantly affected some of the variables. For student participants these were gender and school, while for parents these were age, highest level of education and whether the FFFFP was kept or not. However, adjusted r^2 values were consistently low for the regression models, indicating that there were unmeasured factors influencing changes in behavior and knowledge as well. Changes in behavior and knowledge of student participants were not affected by the dose of the FFFFP. However, because the vast majority of students did not complete the calendars we do not know if there were differences in use between those that kept the FFFFP permanently and those that kept it for a week.

Conclusions

Given the amount of time youth spend in school during the first 2 decades of their lives and that nearly 95% of youth attend school, the impact of schools on the behavioral patterns of youth should not be overlooked (Roseman et al 2011; Story et al 2006). The importance of family involvement in school-based interventions has been noted in previous research. Thus, supporting the importance of studies such as this that evaluate school-based interventions targeting children and their parents. As obesity among both youth and adults continues to rise it is becoming increasingly important to identify effective means of prevention.

While not all of the changes in behavior and knowledge were in the desired direction, students did significantly increase participation in physical activity, significantly decrease screen time, and increase physical activity knowledge. Changes in dietary behaviors and nutrition

knowledge were in the opposite direction of that intended. These results indicate that the FFFFP can significantly impact behaviors and knowledge, but more research is needed to improve nutrition related results. Changes in parent behaviors and knowledge were all in the desired directions, although not all changes were statistically significant. Findings from parent participants are encouraging and increased intervention time may lead to increases in statistically significant changes.

There were several lessons learned that can be used to improve future evaluations. First of all, more detailed protocols for teachers or perhaps additional trainings on data collection are necessary. Questionnaires were completed appropriately, but more than half of the classrooms did not complete the calendars. Those calendars that were completed often had missing data or students wrote in information that did not pertain to the study. Additional supervision while completing the calendars may be necessary, especially considering the age of the participants. Teachers were given a timeline to fill in for FFFFP distribution and collection of questionnaire data. However, none of the teachers turned in completed timelines so researchers cannot be certain that participants (particularly those following the rotating schedule) completed post-questionnaires at the appropriate time. Better labeling of parent questionnaires is also needed. Data was lost when parents did not put their name on the questionnaire. This loss of data could have been minimized in several ways. It may be helpful to add a line on the parent questionnaire for the student's name. This would also help in matching parents to students in cases where the last names differ. Additionally, teachers could be asked to write the student's name on the outside of the envelope containing the completed parent questionnaire. Parents turned in completed questionnaires in a sealed envelope for privacy purposes so teachers were not aware of missing information. The measurement tools themselves also need revising. Based on

answers to nutrition knowledge questions it appeared as though these questions were not well understood by many participants. Additionally, the evaluation tools may not have measured all pertinent confounding factors. The adjusted r^2 values for the regression models were low, indicating that there may be unmeasured factors influencing changes in behavior and knowledge. Lastly, the results of this evaluation indicate that the FFFFP was more successful in improving physical activity behaviors than dietary behaviors, especially among student participants. Future studies utilizing the FFFFP may benefit by including activities that focus on nutrition behaviors as well as knowledge.

There were also several strengths of this evaluation. Due to the large number of participants, power was greater than the standard 80% for both student and parent data. Another strength is that data were collected from parents regarding student dietary and physical activity behaviors. It is often difficult to obtain accurate behavior data from young participants. Obtaining data from parents can give an indication as to the accuracy of the information reported by these participants. Although results from regression analyses suggest that not all of the factors influencing behaviors and knowledge were measured, evaluation tools did measure parent indicators that have been linked to child behaviors.

Results of this evaluation indicate that school-based dietary and physical activity interventions can have a positive impact on both student and parent behavior patterns and knowledge. Future research is needed to create measurement tools that elucidate additional factors affecting these behavior patterns and knowledge. Even though there are inherent difficulties in conducting school-based evaluations it is important to continue to work in this arena as it has been shown to be a promising arena for addressing childhood obesity.

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Chapter 5

SUMMARY OF FINDINGS

The purpose of this research was to evaluate 2 community-based nutrition and physical activity interventions targeting youth in Georgia. Researchers from the Foods and Nutrition Department of the University of Georgia (UGA) partnered with the Center for Pan Asian Community Services (CPACS) to evaluate an after-school program, and with HealthMPowers to evaluate a school-based program. Changes in dietary and physical activity behaviors were assessed from self-reported questionnaire data for both evaluations, although program specific questionnaires were used. Height and weight of CPACS participants were measured by UGA researchers and used to calculate BMI and BMI percentile. Data were collected at baseline and twice following the intervention for CPACS participants. Changes in behaviors and BMI percentile were assessed across waves of data collection overall and between sites. Data were collected at baseline and once following the intervention for HealthMPowers participants. Parents of participating students were also asked to complete a baseline and follow-up questionnaire. Changes in behaviors and knowledge were assessed between baseline and follow-up, overall and between schools.

CPACS After-school Program

Consumption of 'Fruit', 'Vegetable's, 'Healthy' and 'Unhealthy" foods increased overall, but not at statistically significant levels. Although changes in 'Unhealthy' food consumption overall was not in the expected direction, sites 5 and 6 did report decreases in consumption. While

participation in 'Physical Activity' decreased overall, sites 3 and 4 reported increases. Participation in 'Sedentary Activities' increased overall, with only site 5 reporting a decrease. None of the changes in dietary or activity behaviors were statistically significant. BMI percentile increased overall, but this is not surprising due to the age of participants.

Regression analyses indicate that site, BMI percentile and age are significantly associated with dietary and activity behaviors. Even though the intervention was the same at each site 2 sites reported significantly different consumption and activity patterns than the other sites. The 2 sites that were significantly associated with the measured behaviors were each comprised of participants of only 1 race. Participants of site 3, who consumed significantly more foods and participated in significantly more activities, were all Hispanic, while those of site 4, who consumed significantly fewer foods and participated in significantly fewer activities, were all Asian. Race was included in the regression analyses and was not significantly associated with behaviors. BMI percentile was negatively associated with consumption of 'Fruit', 'Vegetable's and 'Healthy' foods and with 'Physical Activity'. Increased age was significantly associated with increased participation in 'Sedentary Activities'.

One-on-one interviews were conducted with parents of participants and the CPACS staff member who delivered the curriculum. Translators were used with all parent interviews. Data collected through parent interviews indicates that money is a barrier to accessing healthier foods. Parents lacked money not only to purchase the foods, but for transportation to grocery stores. Several parents indicated that their children are picky eaters, so they base their meals on what their children will eat, not necessarily what is healthy. Although self-reported data do not indicate significant changes in eating behaviors, parents and CPACS staff did observe an increased willingness of the participants to try new foods. Additionally, several parents reported

that their children were more aware of which foods are healthy versus unhealthy, and were even reading nutrition labels and ingredient lists. All parents that were interviewed felt their children were physically active. Several parents indicated that safety was a concern with respect to neighborhood parks, but still felt their children had opportunities to participate in physical activity. The most common suggestion for improving the intervention was to include classes for parents. CPACS staff indicated similar concerns as parents did for the barriers to eating healthy in this community. The need for more programs like this was emphasized, as was the need for more resources (both money and staff) when conducting these programs.

HealthMPowers School-based Program

Following the intervention students reported a significant increase in physical activity at school as well as an increase in physical activity outside of school. Students also reported a decrease in consumption of both fruits and vegetables, with a statistically significant decrease for fruit consumption. With respect to the knowledge variables, students scored higher for physical activity knowledge but lower for nutrition knowledge following the intervention. Neither change in knowledge was statistically significant. Less than 1 hour per day was the most common (27.5%) answer given by students when asked how many hours per day they spent watching television/playing video or computer games. This was true both at baseline and follow-up. Even so there was a significant decrease in the number of hours spent watching television/playing video or computer games as there was a decrease in the number of students watching 4 and 5 or more hours per day. Additional questions were included on the follow-up questionnaires to assess satisfaction with the FFFFP. This data indicates that the 3 most popular FFFFP activities among students were “Health Bingo”, resistance bands and the workout DVD. More than 50%

of students indicated that they felt the FFFFP changed their eating choices “some” and 58% felt the FFFFP changed their participation in physical activity “a lot”. In an attempt to collect process data students were given calendars and asked each morning at school to write in any activities or healthy habits from the FFFFP. Less than half of the teachers returned calendars completed by students. The information from those who did indicates that the students participate in physical activity most days, but very few actually wrote in activities or healthy habits from the FFFFP.

Two factors, gender and school, were significantly associated with study findings. Male participants reported cooking with their parents significantly fewer times per week than female participants. Male participants also consumed significantly less fruit than females and spent significantly more hours per day watching television/playing video or computer games. Participants from school 2 consumed significantly more fruits and vegetables than students from other schools, but also scored significantly lower for physical activity knowledge. School 3 participants scored significantly higher for nutrition knowledge than students from other schools, but reported participating in significantly less physical activity at school. Finally, participants from school 5 scored significantly higher for physical activity knowledge than participants from other schools.

Following the intervention parents reported participating in significantly more physical activity overall and significantly more physical activity with their child/children. Parents also reported that their children participated in significantly more physical activity both at school and outside of school. Approximately 78% of parents reported taking their children grocery shopping prior to the intervention and 86% following the intervention. Data indicated an increase in number of times parents served fruits and vegetables to their children, but neither

increase was statistically significant. Both physical activity knowledge and nutrition knowledge increased following the intervention. Changes in knowledge were not statistically significant. There were however, significant increases in the frequency of reading nutrient labels and the number of nutrients parents considered when purchasing a food item. Specifically, parents were significantly more likely to consider total fat, cholesterol and sodium following the intervention. Parents were also more likely to consider calories, saturated fat, trans fat and sugar.

Age, level of education and whether the FFFFP was kept or rotated were significantly associated with study findings. Parents who reported being 30-39 exercised significantly more often than those in the other age groups. These parents also reported exercising with their children and serving fruit significantly more often. Those parents who reported being 50-59 indicated that their children participated in physical activity outside of school significantly less often than parents in the other age groups. Parents who listed high school as their highest level of education exercised significantly less often, but reported that their children participated in physical activity at school significantly more often than parents with higher levels of education. Those with high school as their highest level of education also reported serving fruit to their children significantly less often, reading nutrient labels significantly less often, considered significantly fewer nutrients when purchasing foods and scored significantly lower for nutrition knowledge. Parents who reported graduate school as their highest level of education scored significantly lower on physical activity knowledge. Those that kept the FFFFP reported that their children participate in significantly less physical activity outside of school compared to parents in the group that rotated the FFFFP. Additionally, parents in the group that kept the FFFFP reported serving fruit to their children significantly more often than those in the group that rotated the FFFFP.

Limitations

There were several limitations of each evaluation. More than half of the participants of the CPACS program were lost to follow-up. The after-school program at site 2 was cancelled before the conclusion of the study so participants were not available for follow-up data collection. Many participants from site 4 were also lost to follow-up as violence in the community limited participation in the after-school program. Time was also a limitation for this intervention. Because the intervention and data collection took place during an after-school program researchers only had one semester to obtain approval from the IRB, obtain consent and assent, collect wave 1 data, implement the intervention and collect wave 2 data. Thus, time allotted for the evaluation was limited and the evaluation had to be scheduled around the school calendar. Another limitation may have been that parents were not included in the intervention. Most of the participants are young enough that they rely on their parents for purchasing and preparing their meals. Thus, future evaluations may benefit from including parents.

There were also several limitations of the evaluation conducted in partnership with HealthMPowers. More detailed protocols for teachers and additional trainings on data collection are needed. More than half of the classrooms did not complete the calendars and those calendars that were completed often had missing data or students wrote in information that did not pertain to the study. Teachers were given a timeline to fill in for FFFFP distribution and collection of questionnaire data. However, none of the teachers returned completed timelines so researchers cannot be certain that participants (particularly those that rotated the FFFFP) completed post questionnaires at the appropriate time. Better labeling of parent questionnaires is also needed. Data was lost when parents did not put their name on the questionnaire. Lastly, the evaluation tools may not have measured all pertinent confounding factors. The adjusted r^2 values for the

regression models were low, indicating that there may be unmeasured factors influencing changes in behavior and knowledge.

Recommendations

There were several lessons learned that can be used to improve future evaluations. More ethnic specific intervention materials and data collection tools are needed especially when working with recent immigrants and their families. There are often additional factors affecting dietary and physical activity choices for these individuals. Cultural influences on food choices and eating patterns are well established. Types and amounts of food along with flavors, textures, and food combinations vary between cultures (Kumanyika, 2008; Stead et al 2011). Additionally, perception and acceptability of overweight and obesity varies among cultures (Kumanyika 2008; Myers and Vargas 2000). These are important factors to consider when creating interventions targeting obesity.

It is important to include parents in both interventions and evaluations. Lifestyle choices among youth are largely influenced by parent role-modeling (Ellis et al 2005; Rhee 2008). Additionally, youth often rely on their parents to purchase and prepare foods for them, making it important to target parent behaviors as well.

Lastly, training of community partners is imperative. Community partners may have minimal, if any, experience with research methods and data collection. Obtaining consent is always a challenge, particularly when parents may not speak or read English or do not understand the purpose of the study. Thus, appropriate training for community partners who will play a role in collecting parental consent is necessary. It is also important to provide training on data collection methods to reduce loss of data. While it is not always feasible, it is advantageous

for academic partners to be present during at least the first set of data collection to demonstrate methods.

There are advantages and disadvantages to both after-school and school based programs. After-school programs can be customized to the needs of a specific community, but often have a smaller participant population and therefore may be less generalizable. After-school programs also compete with other after-school activities for time making it difficult to ensure attendance and therefore exposure to the program. This can result in fewer statistically significant findings and makes it important to collect evaluation data that will allow researchers to distinguish between program failures and implementation failures. Despite the inherent difficulties, after-school programs are becoming increasingly popular as they do not interfere with classroom time and allow participants to learn in a more relaxed setting.

Schools are often the setting of choice for nutrition and physical activity programs targeting youth as they offer access to large numbers of participants. Programs implemented at schools often have high levels of participation and attendance, which can result in more statistically significant findings and greater generalizability. Additionally, it may be easier to obtain parental consent for school-based programs as these often require little or no additional work from parents. Lastly, participants will already be in the learning mindset, which can enhance focus and participants may retain more of the information provided. Disadvantages of school-based programs include that they require classroom time for non-academic purposes. School-based programs may rely on teachers to implement or collect data. These teachers often have minimal experience conducting research. This can result in implementation failures and losses in data. Additionally, because school-based programs often reach such large numbers of students, it may difficult to tailor these programs to the populations most in need. Both after-school and school-

based programs can positively influence the dietary and physical activity behaviors of youth. Community needs and available resources will help determine which setting is the most appropriate.

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APPENDICES

APPENDIX A

ASIAN MY FOOD CHOICES

MY FOOD CHOICES

1. In the last week, how many times did you drink orange, apple or grape juice?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

2. In the last week, how many times did you drink lowfat milk?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

3. In the last week, how many times did you drink whole milk?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

4. In the last week, how many times did you drink other fruit flavored drinks?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

5. In the last week, how many times did you drink water?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

6. In the last week, how many times did you drink soda?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

7. In the last week, how many times did you eat cereal?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

8. In the last week, how many times did you eat honey buns?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

9. In the last week, how many times did you eat yogurt?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

10. In the last week, how many times did you eat bananas?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

11. In the last week, how many times did you eat apples?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

12. In the last week, how many times did you eat grapes?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

13. In the last week, how many times did you eat pears?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

14. In the last week, how many times did you eat oranges?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

15. In the last week, how many times did you eat raisins?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

16. In the last week, how many times did you eat mixed fruit?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

17. In the last week, how many times did you eat peaches?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

18. In the last week, how many times did you eat chips?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

19. In the last week, how many times did you eat pretzels?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

20. In the last week, how many times did you eat popcorn?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

21. In the last week, how many times did you eat cheese?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

22. In the last week, how many times did you eat peanut butter?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

23. In the last week, how many times did you eat hot wings?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

24. In the last week, how many times did you eat chicken that was NOT fried?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

25. In the last week, how many times did you eat fried chicken/nuggets?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

26. In the last week, how many times did you eat fish sticks?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

27. In the last week, how many times did you eat spaghetti?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

28. In the last week, how many times did you eat macaroni and cheese?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

29. In the last week, how many times did you eat fried rice?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

30. In the last week, how many times did you eat other kinds of rice?

0 times
1 time
2 times
3 times
4 times
5 times
6 times
7 or more times last week

31. In the last week, how many times did you add gravy to it?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

32. In the last week, how many times did you eat greens?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

33. In the last week, how many times did you eat green beans?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

34. In the last week, how many times did you eat other kinds of beans?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

35. In the last week, how many times did you eat sweet potatoes?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

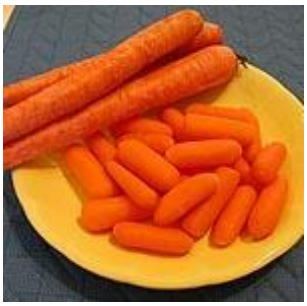
36. In the last week, how many times did you eat French fries or tater tots?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

37. In the last week, how many times did you eat other kinds of potatoes?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

38. In the last week, how many times did you eat carrots?



0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

39. In the last week, how many times did you eat corn?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

40. In the last week, how many times did you eat broccoli?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

41. In the last week, how many times did you eat a tossed salad?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

42. In the last week, how many times did you eat yellow squash?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

43. In the last week, how many times did you eat tomatoes

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

44. In the last week, how many times did you eat vegetable soup?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

45. In the last week, how many times did you eat a hamburger?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

46. In the last week, how many times did you have cheese on it?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

47. In the last week, how many times did you have mayonnaise with food?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

48. In the last week, how many times did you eat pizza?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

49. In the last week, how many times did you eat ice cream?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

50. In the last week, how many times did you eat cookies?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

51. In the last week, how many times did you eat snack cakes?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

52. In the last week, how many times did you eat chocolate candy?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

53. In the last week, how many times did you eat cake?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

54. In the last week, how many times did you add jam, jelly or syrup to food?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

55. In the last week how many times did you eat persimmon?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

56. In the last week how many times did you eat Korean pear?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

57. In the last week how many times did you eat longans?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

58. In the last week, how many times did you eat jackfruit?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

APPENDIX B

HISPANIC MY FOOD CHOICES

MY FOOD CHOICES

1. In the last week, how many times did you drink orange, apple or grape juice?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

2. In the last week, how many times did you drink low-fat milk?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

3. In the last week, how many times did you drink whole milk?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

4. In the last week, how many times did you drink other fruit flavored drinks?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

5. In the last week, how many times did you drink water?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

6. In the last week, how many times did you drink soda?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

7. In the last week, how many times did you eat cereal?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

8. In the last week, how many times did you eat honey buns?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

9. In the last week, how many times did you eat yogurt?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

10. In the last week, how many times did you eat bananas?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

11. In the last week, how many times did you eat apples?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

12. In the last week, how many times did you eat grapes?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

13. In the last week, how many times did you eat pears?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

14. In the last week, how many times did you eat oranges?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

15. In the last week, how many times did you eat raisins?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

16. In the last week, how many times did you eat mixed fruit?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

17. In the last week, how many times did you eat peaches?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

18. In the last week, how many times did you eat chips?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

19. In the last week, how many times did you eat pretzels?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

20. In the last week, how many times did you eat popcorn?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

21. In the last week, how many times did you eat cheese?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

22. In the last week, how many times did you eat peanut butter?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

23. In the last week, how many times did you eat hot wings?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

24. In the last week, how many times did you eat chicken that was NOT fried?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

25. In the last week, how many times did you eat fried chicken/nuggets?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

26. In the last week, how many times did you eat fish sticks?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

27. In the last week, how many times did you eat spaghetti?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

28. In the last week, how many times did you eat macaroni and cheese?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

29. In the last week, how many times did you eat fried rice?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

30. In the last week, how many times did you eat other kinds of rice?

0 times
1 time
2 times
3 times
4 times
5 times
6 times
7 or more times

31. In the last week, how many times did you add gravy to it?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

32. In the last week, how many times did you eat greens?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

33. In the last week, how many times did you eat green beans?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

34. In the last week, how many times did you eat other kinds of beans?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

35. In the last week, how many times did you eat sweet potatoes?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

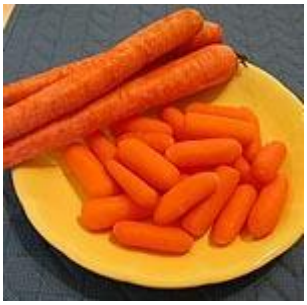
36. In the last week, how many times did you eat French fries or tater tots?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

37. In the last week, how many times did you eat other kinds of potatoes?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

38. In the last week, how many times did you eat carrots?



0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

39. In the last week, how many times did you eat corn?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

40. In the last week, how many times did you eat broccoli?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

41. In the last week, how many times did you eat a tossed salad?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

42. In the last week, how many times did you eat yellow squash?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

43. In the last week, how many times did you eat tomatoes

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

44. In the last week, how many times did you eat vegetable soup?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

45. In the last week, how many times did you eat a hamburger?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

46. In the last week, how many times did you have cheese on it?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

47. In the last week, how many times did you have mayonnaise with food?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

48. In the last week, how many times did you eat pizza?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

49. In the last week, how many times did you eat ice cream?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

50. In the last week, how many times did you eat cookies?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

51. In the last week, how many times did you eat snack cakes?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

52. In the last week, how many times did you eat chocolate candy?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

53. In the last week, how many times did you eat cake?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

54. In the last week, how many times did you add jam, jelly or syrup to food?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

55. In the last week how many times did you eat quesadillas?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

56. In the last week how many times did you eat tacos?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

57. In the last week how many times did you eat burritos?


a.

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

58. In the last week how many times did you eat empanadas?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more times last week

APPENDIX C

MY PHYSICAL ACTIVITIES

MY PHYSICAL ACTIVITIES

1. In the last week, how many times did you jump rope?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

2. In the last week, how many times did you read?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

3. In the last week, how many times did you play basketball?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

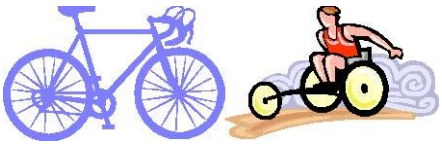
4. In the last week, how many times did you play video games?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

5. In the last week, how many times did you play football?

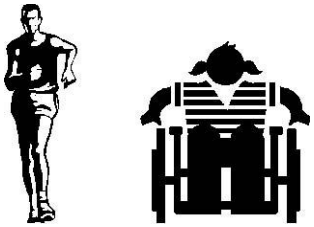
0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

6. Inthe lastweek, how manytimesdid you ride a bicycle orhand cycle?



0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

7. In the last week, how many times did you take a walk/push?



0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

8. In the last week, how many times did you play on a playground?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

9. In the last week, how many times did you play on the computer?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

10. In the last week, how many times did you cheerlead/go to dance class?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

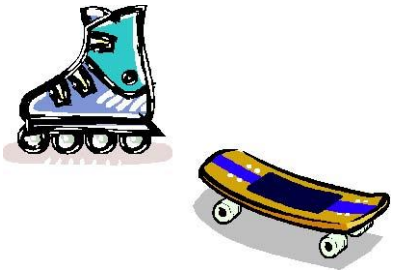
11. In the last week, how many times did you watch television?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

12. In the last week, how many times did you dance?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

13. In the last week, how many times did you skate/skateboard?

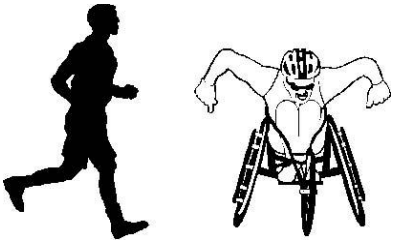


0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

14. In the last week, how many times did you play soccer?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

15. In the last week, how many times did you run/jog or sprint/road race?

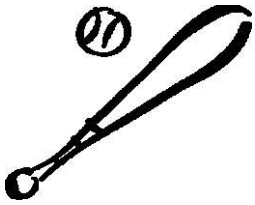


0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

16. In the last week, how many times did you talk on the telephone/text message?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

17. In the last week, how many times did you play baseball/softball?



0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 times or more last week

18. In the last week, how many times did you play tennis?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

19. In the last week, how many times did you play volleyball?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

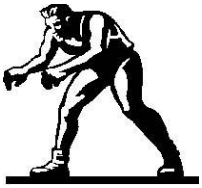
20. In the last week, how many times did you stretch?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

21. In the last week, how many times did you go swimming?

0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

22. In the last week, how many times did you wrestle?



0 times last week
1 time last week
2 times last week
3 times last week
4 times last week
5 times last week
6 times last week
7 or more last week

APPENDIX D

BMI FORM

Height and Weight Data Collection

Date: _____

Participant's Name: _____

Birthdate: _____

Grade: _____

Gender: _____

Weight (to the nearest tenth of a pound): _____

Height (to the nearest eighth of an inch): _____

BMI: _____

BMI Percentile: _____

Weight Category: _____

APPENDIX E

STUDENT PRE-QUESTIONNAIRE

Participant ID: _____

Name: _____

Grade:

a) 3rd
b) 4th
c) 5th

Gender:

a) Male
b) Female

Teacher:_____

1) How many times per week do you play sports at school?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

2) How many times per week do you play sports OUTSIDE of school?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

3) Do you go grocery shopping with your parents?
   a) Yes
   b) No

4) How many times per week do you cook with your parents?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

5) How many times per week do you eat fruit?
   a) Never
   b) 1 time
   c) 2 times
   d) 3 times
   e) 4 times
   f) 5 times

6) How many times per day do you eat vegetables?
   a) Never
   b) 1 time
   c) 2 times
   d) 3 times
   e) 4 times
   f) 5 times

7) How many minutes of physical activity should kids your age participate in each day?
   a) 30 minutes
   b) 40 minutes
   c) 50 minutes
   d) 60 minutes

8) How many servings of fruits and vegetables should kids your age eat each day?
   a) 1 serving
   b) 2 servings
   c) 3 servings
   d) 4 servings
   e) 5 servings

9) Which of these snacks is the healthiest?
   a) Potato chips
   b) Snack cake
   c) Carrot sticks
   d) Pizza

10) Which of these snacks is the LEAST healthy?
   a) Apple sauce
   b) Granola bar
   c) Yogurt
   d) Candy bar

11) On school days, how many hours so you watch TV or play video games or computer games or use a computer for something that is not school work?
   a) Never
   b) Less than 1 hour per day
   c) 1 hour per day
   d) 2 hours per day
   e) 3 hours per day
   f) 4 hours per day
   g) 5 or more hours per day

APPENDIX F

STUDENT POST-QUESTIONNAIRE

Participant ID: _____

Name: _____

Grade:

a) 3rd
b) 4th
c) 5th

Gender:

a) Male
b) Female

Teacher:_____

1) How many times per week do you play sports at school?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

2) How many times per week do you play sports OUTSIDE of school?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

3) Do you go grocery shopping with your parents?
   a) Yes
   b) No

4) How many times per week do you cook with your parents?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

5) How many times per week do you eat fruit?
   a) Never
   b) 1 time
   c) 2 times
   d) 3 times
   e) 4 times
   f) 5 times

6) How many times per day do you eat vegetables?
   a) Never
   b) 1 time
   c) 2 times
   d) 3 times
   e) 4 times
   f) 5 times

7) How many minutes of physical activity should kids your age participate in each day?
   a) 30 minutes
   b) 40 minutes
   c) 50 minutes
   d) 60 minutes

8) How many servings of fruits and vegetables should kids your age eat each day?
   a) 1 serving
   b) 2 servings
   c) 3 servings
   d) 4 servings
   e) 5 servings

9) Which of these snacks is the healthiest?
   a) Potato chips
   b) Snack cake
   c) Carrot sticks
   d) Pizza

10) Which of these snacks is the LEAST healthy?
   a) Apple sauce
   b) Granola bar
   c) Yogurt
   d) Candy bar

11) On school days, how many hours so you watch TV or play video games or computer games or use a computer for something that is not school work?
   a) Never
   b) Less than 1 hour per day
   c) 1 hour per day
   d) 2 hours per day
   e) 3 hours per day
   f) 4 hours per day
   g) 5 or more hours per day

12) Which of the Family Fun Pack activities was your favorite?
   a) DVD
   b) Raid the Pantry
   c) Commercial Competition
   d) Resistance Bands
   e) Food Hunt
   f) “Health” Bingo

13) How much did the activities change what you eat?
None Some A Lot

14) How much did the activities change how often you are physically active?
None Some A Lot

APPENDIX G

PARENT PRE-QUESTIONNAIRE

Participant ID: _____

Name: _____

Age:

a) 20-29
b) 30-39
c) 40-49
d) 50-59

Please indicate the highest level of education you have completed:

a) Some high school
b) High school
c) Some college
d) Associates degree
e) Bachelor's degree
f) Graduate degree

Number of children (under 18) in your household: _____

1) How many times per week do you exercise?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

2) How many times per week do you exercise with your child/children?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

3) Do your children go grocery shopping with you?
   a) Yes
   b) No

4) How many times per week does your child play exercise or play sports at school?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

5) How many days per week does your child exercise or play sports OUTSIDE of school?
   a) Never
   b) 1-2 times per week
   c) 3-4 times per week
   d) 5-6 times per week
   e) 7 or more times per week

6) How many times per day do you serve fruits to your child/children?
   a) Never
   b) 1 time
   c) 2 times
   d) 3 times
   e) 4 times
   f) 5 times

7) How many times per day do you serve vegetables to your child/children?
   a) Never
   b) 1 time
   c) 2 times
   d) 3 times
   e) 4 times
   f) 5 times

8) How many minutes of physical activity should your child/children participate in each day?
   a) 30 minutes
   b) 40 minutes
   c) 50 minutes
   d) 60 minutes

9) How many servings of fruits and vegetables should your child/children eat each day?
   a) 1 serving
   b) 2 servings
   c) 3 servings
   d) 4 servings
   e) 5 servings

10) How many minutes of physical activity should adults participate in each day?
   a) 10 minutes
   b) 20 minutes
   c) 30 minutes
   d) 40 minutes

11) How many fruits and vegetables should adults eat each day?
   a) 1 serving
   b) 2 servings
   c) 3 servings
   d) 4 servings
   e) 5 servings

12) Which of these snacks is the healthiest?
   a) Potato chips
   b) Snack cake
   c) Carrot sticks
   d) Pizza

13) Which of these snacks is the LEAST healthy?
   a) Apple sauce
   b) Granola bar
   c) Yogurt
   d) Candy bar

14) How frequently do you read nutrient labels?
   Never Almost Never Sometimes Almost Always Always

15) When deciding whether to purchase a food item, which nutrients are important to you? (circle all that apply)

a) Calories
b) Total fat
c) Saturated fat
d) Trans fat
e) Cholesterol
f) Sodium
g) Sugar

APPENDIX H

PARENT POST-QUESTIONNAIRE

Participant ID: _____

Name: _____

Age:

a) 20-29
b) 30-39
c) 40-49
d) 50-59

Please indicate the highest level of education you have completed:

a) Some high school
b) High school
c) Some college
d) Associates degree
e) Bachelor's degree
f) Graduate degree

Number of children (under 18) in your household: _____

1) How many times per week do you exercise?

a) Never
b) 1-2 times per week
c) 3-4 times per week
d) 5-6 times per week
e) 7 or more times per week

1) How many times per week do you exercise with your child/children?

a) Never
b) 1-2 times per week
c) 3-4 times per week
d) 5-6 times per week
e) 7 or more times per week

2) Do your children go grocery shopping with you?

a) Yes
b) No

3) How many times per week does your child play exercise or play sports at school?

a) Never
b) 1-2 times per week
c) 3-4 times per week
d) 5-6 times per week
e) 7 or more times per week

4) How many days per week does your child exercise or play sports OUTSIDE of school?

a) Never
b) 1-2 times per week
c) 3-4 times per week
d) 5-6 times per week
e) 7 or more times per week

5) How many times per day do you serve fruits to your child/children?

a) Never
b) 1 time
c) 2 times
d) 3 times
e) 4 times
f) 5 times

6) How many times per day do you serve vegetables to your child/children?

a) Never
b) 1 time
c) 2 times
d) 3 times
e) 4 times
f) 5 times

7) How many minutes of physical activity should your child/children participate in each day?
   a) 30 minutes
   b) 40 minutes
   c) 50 minutes
   d) 60 minutes

8) How many servings of fruits and vegetables should your child/children eat each day?
   a) 1 serving
   b) 2 servings
   c) 3 servings
   d) 4 servings
   e) 5 servings

9) How many minutes of physical activity should adults participate in each day?
   a) 10 minutes
   b) 20 minutes
   c) 30 minutes
   d) 40 minutes

10) How many fruits and vegetables should adults eat each day?
   a) 1 serving
   b) 2 servings
   c) 3 servings
   d) 4 servings
   e) 5 servings

11) Which of these snacks is the healthiest?
   a) Potato chips
   b) Snack cake
   c) Carrot sticks
   d) Pizza

12) Which of these snacks is the LEAST healthy?
   a) Apple sauce
   b) Granola bar
   c) Yogurt
   d) Candy bar

13) How frequently do you read nutrient labels?
   Never Almost Never Sometimes Almost Always Always

14) When deciding whether to purchase a food item, which nutrients are important to you? (circle all that apply)
   a) Calories
   b) Total fat
   c) Saturated fat
   d) Trans fat
   e) Cholesterol
   f) Sodium
   g) Sugar

15) How clear were the instructions for the Family Fun Pack activities?
Very Easy Easy Neutral Difficult Very Difficult

16) Please check each activity and/or healthy habits you and your family participated in:

Activities

___ DVD

___ Raid the Pantry

___ Commercial Competition

___ Resistance Bands

___ Food Hunt

___ "Health" Bingo

Health Habits

___Vary Your Veggies

___ Focus on Fruits

___ Get Your Calcium Rich Foods

___ Make Half Your Grains Whole

___ Go Lean with Protein

___ Watch Your Fats, Sugars and Salt

___ Balance What You Eat with Physical Activity

17) Which of the activities was your favorite?

a) DVD
b) Raid the Pantry
c) Commercial Competition
d) Resistance Bands
e) Food Hunt
f) "Health" Bingo

18) Which of the activities was your child's favorite?

a) DVD
b) Raid the Pantry
c) Commercial Competition
d) Resistance Bands
e) Food Hunt
f) "Health" Bingo

19) How much did the activities change your eating habits?
None Some A Lot

20) How much did the activities change your physical activity habits?
None Some A Lot

21) How likely are you to continue participating in the Family Fun Pack activities?
Not at all Somewhat Neutral Likely Very Likely

22) How can the Family Fun pack be improved?

APPENDIX I

CALENDAR

ACTIVITY LEGEND
DVD = Family Night Exercise DVD
RP = Raid the Pantry
CC = Commercial Competition
BA = Family Night Resistance Band Activity
FH = Colorful Food Hunt
FB = Family Night Bingo
HH # ___= Health Habit # _____

Family Food & Fitness Fun Pack
January

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	*3*	*4*	*5*	*6*	*7*	*8*
9	*10*	*11*	*12*	*13*	*14*	*15*
16	*17*	*18*	*19*	*20*	*21*	*22*
23	*24*	*25*	*26*	*27*	*28*	*29*
30	*31*					