A STUDY TO EXAMINE THE EFFECT OF SOCIAL DETERMINANTS OF HEALTH ON THE OBESITY RATE AMONG TEXAS CHILDREN

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF HEALTH SCIENCES

BY

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DENTON, TEXAS

AUGUST 2012

TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS

June 27, 2012

To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Liset Leal Vasquez entitled "A Study to Examine the Effect of Social Determinants of Health on The Obesity Rate among Texas Children." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Health Studies.

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We have read this dissertation and recommend its acceptance:

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DEDICATION

This dissertation is dedicated to my husband Robert Vasquez, for always believing in me and encouraging me to follow my dreams; and to my three beautiful children Jacob, Madison and Olivia who are the love of my life. Thank you for all your support and prayers. I love you all very much!

ACKNOWLEDGMENTS

First and foremost I give all the thanks, honor and glory to my Lord and Savior, Jesus Christ for all he has done for me and my family. I would also like to acknowledge all the individuals that have supported, guided and mentored me through the process of dissertation and completing my degree. Dr. Kristin Wiginton, thank you for graciously agreeing to serve as chair of my dissertation committee and for your guidance. To my dissertation committee members, Dr. Kimberly Parker and Dr. Douglas Coyle, I truly appreciate your willingness to serve on my committee and for your support. I have learned a lot through the past years, while taking classes with each of you and will continue to challenge myself to new heights.

To my husband, Robert Vasquez, thank you for always encouraging me to follow my dreams and for managing the household, while I spent many nights studying and working on my dissertation. To my son Jacob, you are currently 14 years old and you are a born rocker! I am so amazed by your musical talent. Follow your dreams; I will always be your biggest fan! Madison you are currently 11 years old and you are a true athlete. Your natural skills at soccer continue to amaze me. Know that whatever you decide to pursue, I will support you 100%. Olivia you are currently 4 years old (soon to be 5) and you are a fairy princess. You love school and can't wait to start kindergarten. To my wonderful parents Raul and Gracie Leal, who have always supported and encouraged me to do my best. Thank you for being the best parents ever! To my Aunt Minerva Fuentes

for all her support in helping me get through my comps and for always encouraging me to keep going! To my beloved grandmother, Julia Campos, who I know would be extremely proud of me. To my mentor, colleague and friend, Mary Sanchez who shares my love for learning and who always provided positive encouragement. I love each of you from the bottom of my heart.

ABSTRACT

LISET LEAL VASQUEZ

A STUDY TO EXAMINE THE EFFECT OF SOCIAL DETERMINANTS OF HEALTH ON THE OBESITY RATE AMONG TEXAS CHILDREN

AUGUST 2012

Obesity is an epidemic and considered an urgent health threat across the United States (Centers for Disease Control and Prevention [CDC], 2012a; Dietz, 1998; Wang & Dietz, 2002). The obesity prevalence has more than tripled since 1980 among children and adolescents, placing them a greater risk for chronic illness (CDC, 2012a). The goal of the current study was to test the association between household incomes, safe neighborhoods, health care coverage/utilization, and parental education level to childhood obesity in Texas. The study was ex-post facto using a secondary dataset from the 2007 National Survey of Children's Health (NSCH). The national representative data was collected by telephone interview of parents/guardians of 91,642 children ages 3-17 living in households across the United States. The data analysis included structural equation modeling with mediation and logistic regression. The study sample included 714 participants. One of the important demographic features of the sample was the large number of Hispanics (44.5%), followed closely by Caucasian (38.4%), African-American (11.2%), and multi/other or non-Hispanics (5.5%). Study findings provided valuable

insights on the continued needs that low-income children face, such as lack of parent employment, receiving state assistance and poorer health.

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CHAPTER I

INTRODUCTION

Statement of the Problem

Obesity is an epidemic and is considered a serious health threat across the United States (Centers for Disease Control and Prevention [CDC], 2012a; Dietz, 1998; Wang & Dietz, 2002). Alarming statistics suggest that the prevalence of obesity has nearly tripled among children and adolescents since 1980 (CDC, 2012a). It is estimated that approximately 17% (or 12.5 million) of children and adolescents aged 2–19 are obese, placing this generation of children at risk for chronic illness (CDC, 2012a). Obesity is also prevalent among low-income preschool children with 1 in 7 now considered obese (CDC, 2012a). In Texas, 35% of school age children are considered overweight or obese (Texas Health Institute, 2006).

As the rate of childhood obesity increases, so too does the number of children who are food insecure, a term used to describe a lack of access to food due to limited household funds and resources (Nord, Coleman-Jensen, Andrews, & Carlson, 2010). It is estimated that 49 million Americans are food insecure, with 17 million of them being children (San Antonio Food Bank [SAFB], 2009). Texas is the second most food insecure state with 24.3% of children living in poverty, compared to the national average of 20.0% (SAFB, 2009).

These figures fall short of the Healthy People 2020 goal to reduce the proportion of children and adolescents who are overweight or obese (US Department of Health and Human Services [USDHHS], 2011). Obese children and adolescents are at greater risk for numerous health concerns, including hypertension, dyslipidemia, atherosclerosis, metabolic syndrome, type 2 diabetes, sleep apnea, and a non-alcoholic related fatty liver (CDC, 2012c; Pratt, Stevens, & Daniels, 2008). From a psychological perspective, obesity can also contribute to social stigmatization and discrimination and depression (Pratt et al., 2008).

Obesity is defined as weight that is above average when compared to a person's height (CDC, 2012c). In simple terms, obesity is an energy imbalance: a person eats too many calories and does not engage in enough exercise. For children and adolescents aged 2-19 years, the Body Mass Index (BMI) screening tool is used to determine whether the children and adolescents are at the appropriate weight based on their height (CDC, 2012c; see Appendix A).

Social determinants of health, such as a low family income, lack of education, poor housing, unsafe neighborhoods, and lack of health care can detrimentally impact health (Braveman & Egerter, 2008). Low-income individuals and minorities have a higher risk of being overweight and having poor health because, in many cases, their environments do not support healthy lifestyles (Braveman & Egerter, 2008).

Due to the current conditions, it is evident that children and their families need proven strategies to support themselves, to strengthen their community ties, and to build

their capacity to prevent disease. Therefore, this study, examined the socioeconomic conditions that may factor into the rising trend of childhood obesity in the state of Texas.

Statement of Purpose

The purpose of this study was to examine the association between indicators of child health, health insurance, poverty, neighborhood environments, ethnicity, parent employment, and parent educational level to childhood obesity in Texas. Each of these topics was measured by several items which are detailed below.

- Health insurance (if health coverage met health care needs, if coverage had been consistent over the past year, what type of coverage)
- Children's health (how many preventative visits for health care, where health care was received, if health care was delayed or not received, if the children had asthma or diabetes)
- Poverty (if cash assistance, food stamps, or free or reduced school breakfast or lunch were received from the state)
- Neighborhood environments (if the neighborhood was safe for children, if people in the neighborhood helped each other, if people in the neighborhood could count on one another, if there were neighborhood recreation centers, sidewalks, and playgrounds, if housing was poorly kept)
- Other demographic variables (parent education level, ethnicity, and employment)

To achieve this goal, a multivariate model of U.S. children living in diverse household environments was hypothesized (see Figure 1). Ideally, the model might be

useful for explaining, and ultimately predicting, the degree that specific factors may contribute to obesity among children in this study.

Theoretical Foundation

Sallis and Owens (as cited in Glanz et al., 2002) stated that ecology refers to the complex relationships and connections between people and their present environment. Thus, the Social Ecological Model of health behavior is a systems-theory approach to understand how various levels of influence and factors interact and affect health behavior (Klein et al., 1999). The Social Ecological Model not only addresses individual (intrapersonal) factors, but also addresses interpersonal, institutional or organizational, community, and public policy factors as well (Mckenzie, Neiger & Thackeray, 2009; Sallis & Owens, as cited in Glanz et al., 2002). This study considered factors that contribute to childhood obesity at multiple levels and described the principles of the Social Ecological Model as a potential framework for addressing the issue of childhood obesity (Klein et al., 1999; Sallis & Owens, as cited in Glanz et al., 2002).

Hypotheses

The null hypotheses for this study were as follows:

1. Neighborhood and environmental factors will not significantly mediate the relationship between health care and insurance factors and BMI of Texas children.
2. Neighborhood and environmental factors will not significantly mediate the relationship between child health factors and BMI of Texas children.

3. Neighborhood and environmental factors will not significantly mediate the relationship between poverty factors and BMI of Texas children.
4. The variables related to demographics, health care, childhood health, poverty, and neighborhood and environment will not be predictive of obesity among Texas children.

Delimitations

The delimitations for this study were as follows:

1. The model used in this study could only be used to examine the impact that employment and income, ethnicity, neighborhood characteristics, parent education level, and health care access and utilization have on childhood obesity.
2. This study only involved children living in Texas during 2007.

Limitations

The limitations for this study were as follows:

1. The original survey of this study only collected responses from approximately 1805 children who were living in Texas. Therefore, this study may not represent the views and opinions of the larger population in Texas.
2. This study only involved children and adolescents aged 10–17.
3. The original survey of this study may have missed a certain population because of lack of household phone access, which was the sole way to complete the interview.
4. Height and weight were self-reported from parents and guardians.

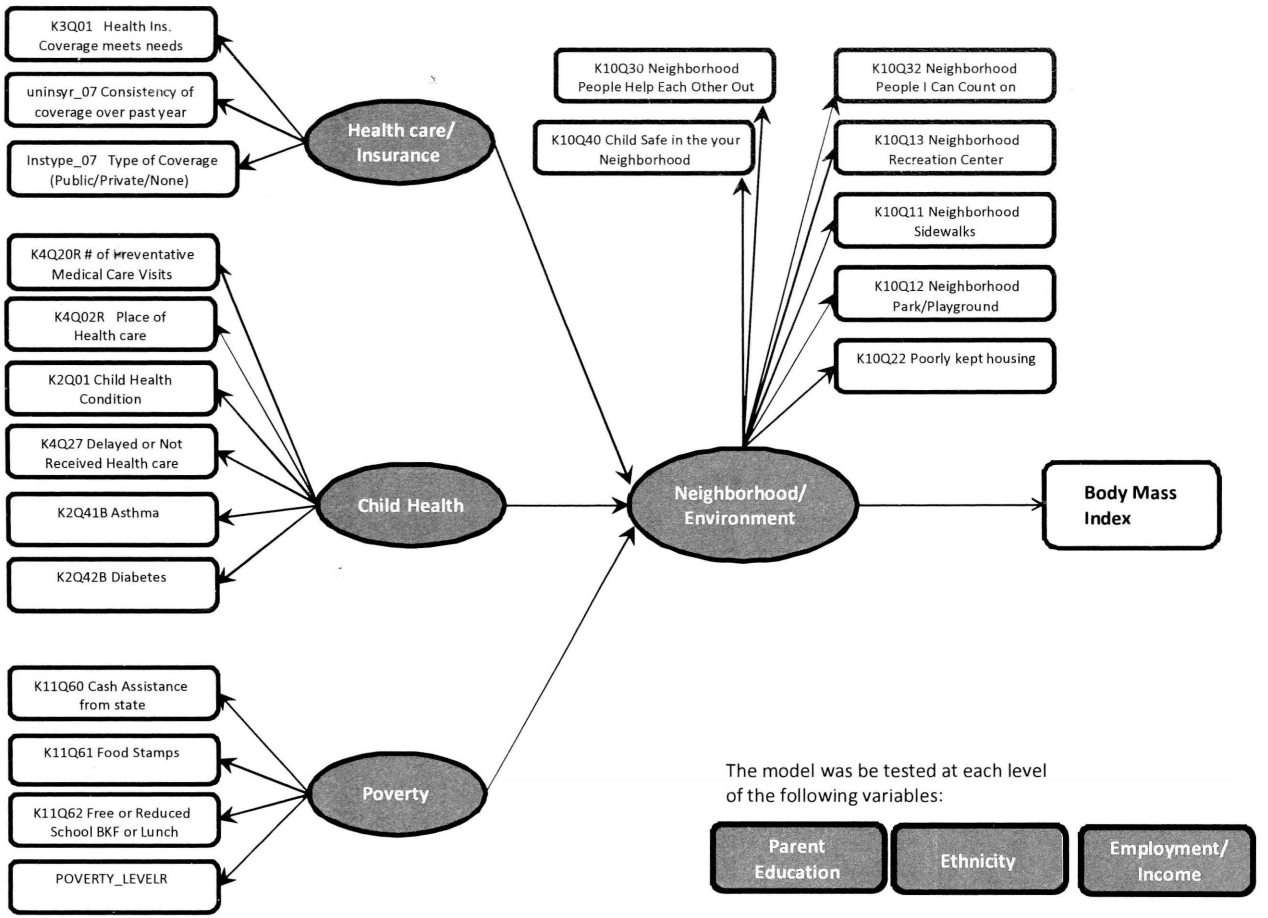

Figure 1. Structural Equation Model. This diagram illustrates the structural equation model developed for the study. Ovals represent latent variables and rectangles represent actual observed items. Arrows represent the hypothesized directional relationship among variables and latent constructs.

Assumptions

The assumptions for this study were as follows:

1. Participants in the original study answered honestly and accurately.
2. The Centers for Disease Control and Prevention followed correct protocol when obtaining their data set.

Definition of Terms

Federal Poverty Level (FPL): Guidelines to describe poverty thresholds and to determine financial eligibility for federal programs (USDHHS, 2010).

Overweight: "BMI for age at or above the 85th percentile and less than the 95th percentile" (CDC, 2012b, para 3).

Obesity: "BMI for age at or above the 95th percentile" (CDC, 2012b, para 3).

Social Determinants of Health: "Social factors and the physical conditions in the environment in which people are born in, live, learn, play, work, and grow old , all of these factors can influence health and the quality of life" (U.S. Department of Human Health and Human Services, Healthy People 2020 Determinants of Health, webpage, 2011).

Significance of the Study

Health experts have noted that this generation may be the first to live a shorter lifespan than their parents (Alliance for a Healthier Generation [AHG], 2012). Moreover, childhood obesity will strain health care systems and state budgets which further-impacts children's ability to grow into healthy successful adults (Mulheron & Vonasek, 2009).

There is no simple solution, but experts agree that we can reverse the childhood obesity epidemic and create healthier environments through the collaborative effort of families, schools, community organizations, faith-based institutions, government agencies, media, and health care providers (Wechsler, McKenna, Lee, & Dietz, 2004). Research suggests that the greatest way to improve health is by creating opportunities and solutions that help people choose health; by removing barriers, people can be more likely to make healthy choices (Braveman & Egerter, 2008). Many factors contribute to childhood obesity; however, most researchers focus on individual causes of obesity such as lack of physical activity; lack of fruits, vegetables, and whole grains in children's diets; and excess TV viewing. Less is known about how environments, food systems, and family structures and influences impact childhood obesity in certain communities.

This study attempted to provide a better understanding of how socioeconomic conditions affect childhood obesity rates in Texas and to urge policy makers to further address solutions and strategies that improve health and reduce obesity. Thus, the study examined barriers and explored strategies to improve the overall health of our children and to reduce the prevalence of childhood obesity.

CHAPTER II

REVIEW OF LITERATURE

The Epidemic of Childhood Obesity

Childhood obesity has become a major focus of public health in the United States and has reached epidemic proportions, with the prevalence nearly tripling in the past 30 years (Centers for Disease Control and Prevention [CDC], 2012a; Wang & Dietz, 2002). Staggering statistics also have suggested that one out of every seven, low-income U.S. children between the ages of 2-5 is obese; with select racial/ethnic populations being more affected (BMI $\geq$ 85th percentile; CDC, 2012a; Taveras, Gillman, Kleinman, Rich-Edwards, & Rifas-Shiman, 2010). Over 12 million U.S. children and adolescents (17%) are obese (CDC, 2012a). Financially, childhood obesity is currently estimated to cost $3 billion/year (White House Task Force on Childhood Obesity, 2010).

Childhood obesity is commonly caused by a combination of factors, such as overeating, lack of physical activity, family history, and psychological, environmental, socioeconomic, and genetic factors (AHG, 2012; CDC, 2012c; Mayo Foundation, 2010; USDHHS, 2010). Unhealthy habits, such as poor diet and lack of physical activity, can be directly or indirectly influenced by many factors of society, including families, communities, schools, childcare settings, health care providers, faith-based institutions, government agencies, media, and food, beverage and entertainment industries (CDC, 2012c). In addition, other factors, such as cost, convenience, and cultural preference, can influence daily food consumption (Levi, Segal, Laurent & Kohn, 2011). A study of

fourth- and eighth-grade students in Texas ($N = 11,594$), revealed a significant reporting of sedentary behaviors such as excessive television watching, snacking, and eating foods commonly advertised on television (Vader, Walters, Harris, & Hoelscher, 2009). In this same study, there was a significant association between watching 1–2 hours of television per day and being overweight among eighth-grade students (Vader et al., 2009).

The increase in childhood obesity places this generation at risk for numerous health concerns, including asthma, hypertension, dyslipidemia, atherosclerosis, metabolic syndrome, type 2 diabetes, sleep apnea, fatty liver conditions, and early puberty for girls (CDC, 2012b; Levi et al., 2011; Pratt et al., 2008; Robert Wood Johnson Foundation [RWJF], 2010). Obesity can also contribute to several negative psychological outcomes, such as stigmatization, discrimination, and depression in children and youth (Pratt et al., 2008; USDHHS, 2010). Childhood obesity can contribute to increased school absences and lower grades (Arons, 2011). Overweight children also have a greater chance of becoming overweight or obese adults (AHG, 2012; Braveman & Egerter, 2008; USDHHS, 2011). Moreover, the early cycle of poor health and childhood obesity can hinder educational attainment and can negatively impact future employment (Braveman & Egerter, 2008). According to Mission Readiness-Military Leaders for Kids, more than 75% of all Americans between the ages of 17–24 are not eligible for military service due several disqualifiers, with one being their weight status as well as education status and having a health condition, such as asthma (Christeson, Taggart, & Messner-Zidell, 2010).

The benefits of healthy eating and physical activity are well documented and include reducing mortality and chronic illnesses, such as coronary heart disease, ischemic

stroke, type 2 diabetes, certain types of cancer, and osteoporosis (Powell, Slater, & Chaloupka, 2004). Physical activity at high levels has been shown to increase self-esteem and to reduce stress levels in youth (CDC, 2012c; Powell et al., 2004).

Despite benefits of physical activity and weight management, rates of physical inactivity and obesity among adolescents remain high in the United States (Powell et al., 2004). Although individual behavior is an important factor in whether or not children and youth will engage in physical activity and healthy eating, opportunities to be consistently active and to have regular access to healthy foods are "linked to social and economic development and policies in agriculture, transportation, education, urban and environment planning, and food processing, distribution, and marketing" (World Health Organization [WHO], 2012, para 2). To that end, children from low-income communities are the most vulnerable groups and are those most affected by overweight and obesity because of their environments (WHO, 2012).

Literature and Policies Related to Childhood Obesity

Several programs and initiatives; reports, studies, and acts; and Texas policies and legislation have been developed and implemented at state and local levels to address and reverse the childhood obesity epidemic. This study was designed to emphasize Texas policies because Texas is the sample for this study. The purpose of this policy review is to understand the policies that have been enacted and to determine if there are gaps that still need to be addressed.

Prevention Policies and Objectives

Prevention policies and programs are cost effective, reduce health care costs, and improve productivity (National Prevention Council, 2011). According to the World Health Organization (2012, para 2), the childhood obesity epidemic is a "societal issue that will require a population-based multi-societal, multi-disciplinary and cultural relevant approach." Addressing this epidemic requires policies and interventions that are comprehensive and address overweight/obesity and the socioeconomic determinants of unhealthy diets and physical inactivity (WHO, 2012). Strengthening policy will also help people's abilities to make healthy choices and decisions by creating paths towards a healthier lifestyle (Levi et al., 2011).

The U.S. Department of Health and Human Services (2011) developed a set of objectives, called *Healthy People 2020*, to improve the overall health of Americans. The *Healthy People 2020* list specific objectives that pertain to nutrition and weight status for children and adolescents, including the following: "1) Reduce the proportion of children and adolescents [who] are considered obese, and 2) Prevent inappropriate weight gain in youth (developmental)" (USDHHS, 2011, Nutrition and Weight Status Objectives, NWS 10 and 11). In addition, a new goal of the White House Task Force on Childhood Obesity (2010) is to reduce the childhood obesity rate from 17% to 5% by 2030.

Reports, Studies, and Policies

F as in Fat: How obesity policies are failing in America. A report by the Trust for America's Health (TFAH) titled "How Obesity Threatens America's Future 2011" provides a summary of obesity-related legislation, standards, programs, and initiatives in

schools and communities (Levi, Segal, Laurent, & Kohn, 2011). Including Texas, 20 states have passed stricter school breakfast and lunch guidelines that go beyond USDA requirements; 27 states have passed stricter standards for food and beverages that are sold in schools including vending machines, a la carte, and school stores (Texas included). Legislators in every state have worked to improve their states' PE requirements, but many times these efforts are not enforced or do not meet quality standards. Legislators in 21 states have passed requirements for BMI screening (Texas requires other weight-related screening measures). Twenty-six states have farm-to-school programs (Texas included); however, only some states have a law to sustain this practice. Thirty-four states and D.C. have sales tax on soda (Texas included), and four states have menu-labeling legislation (Texas not included). Sixteen states have passed complete street policy (implementing policy assures that safe streets are designed for access regardless of the type of transportation) (Texas not included; Levi, Segal, Laurent & Kohn, 2011; National Complete Streets Coalition, 2011).

In the same report, "F as in Fat", 6 policy priorities were identified that were grounded in scientific research and developed to work towards reducing obesity. According to Levi and colleagues (2011), the 6 policy priorities include:

- School foods and beverages must meet or exceed Dietary Guidelines for Americans,
- Access to healthy and affordable foods through improved grocery stores and bodegas,
- Improved time, intensity, and duration of physical activity in school and community programs,
- More opportunities for physical activity by enhancing the built environment in communities,
- Promotion of the purchases of healthier foods through pricing strategies, and

- Lower marketing exposure of unhealthy foods.

Healthy, Hunger-Free Kids Act (HHFKA). On December 13, 2010, the Healthy, Hunger-Free Kids Act was signed into law by President Obama (The White House, n.d.). The Healthy, Hunger-Free Kids Act was designed to build on the wellness policy from 2006 (as mentioned below) and requires schools: (a) to make the content of the policy more understandable and available to parents, students, and communities; (b) to measure and evaluate the effectiveness of wellness policies; and (c) to provide resources and training to assist school officials in compliance, implementation, promotion, dissemination, and evaluation of the policy (Levi et al., 2011). In 2006–2007, public school districts were required as part of the Child Nutrition and WIC Reauthorization Act of 2004 to develop and implement a wellness policy to address nutrition, physical activity, and guidelines for competitive foods and beverages (Levi et al., 2011; School Wellness Policies, n.d.).

In addition, the goals of the Healthy, Hunger-Free Kids Act include improving nutrition standards for all school food, offering assistance for farm-to-school networks and school gardens, improving the nutrition of commodity foods, offering water during school meals, promoting nutrition in early childhood centers, and providing support for breastfeeding initiatives/programs (The White House, n.d.). Additionally, the Healthy, Hunger-Free Kids Act was developed to provide more universal access to meals by eliminating paper applications, by basing income eligibility on census data, and by providing meals to at-risk children who participate in after-school programs (The White House, n.d.).

providing meals to at-risk children who participate in after-school programs (The White House, n.d.).

Bridging the Gap. A report by the Robert Wood Johnson Foundation (RWJF) titled "Bridging the Gap" led researchers to conclude that many school districts have made some improvements in their overall wellness polices. However, many do not comply with federal laws or align with national recommendations for nutrition or physical activity (Johnson, O'Malley & Terry-McElrath, 2011; Levi et al., 2011).

Policy Legislation and Taskforce in Texas

In 2007, school districts in Texas that participated in the National School Lunch Program, the School Breakfast Program, and the Afterschool Care Program were required to follow nutritional requirements that were outlined by the Texas Department of Agriculture (TDA) Food and Nutrition Division (FND). The Texas Public School Nutrition Policy (TPSNP) was created as an effort to improve the nutritional environments in schools (TDA, 2010). The TPSNP prohibits schools from serving foods of minimal nutritional value and requires schools to provide more fruits, vegetables, and milk. In 2008–2009, these policy requirements affected 2.9 million children across Texas in both public and private schools (Arons, 2011).

In 2010 in Texas, Senate Bill 556 established an Interagency Obesity Council to promote health and nutrition among children and adults in an effort to prevent obesity (Staples, Lakey & Scott, n.d.). The council consists of the Texas Department of Agriculture, the Texas Department of State Health Services, and the Texas Education Agency. To further sustain childhood obesity efforts, the following councils and

taskforces were developed: 1) Texas Senate Bill 395 created the Early Childhood Health and Nutrition Interagency Council to develop a plan of best practices in early childhood programs, 2) Texas Senate Bill 343 created the Healthy Advisory Committee to study foods available through retail, 3) Texas Senate Bill 1027 mandated a farm-to-school coordination task force, and 4) Texas Senate Bill 19/1357 mandated school districts to develop a School Health Advisory Council (Staples et al., n.d; Winterfeld, Shinkle, & Morandi, 2010). In addition, the following programs are promoted in Texas: Texas Plate, Eat between the Lines, a restaurant-based portion control program; Texas! Bringing Back Healthy, aimed at educating and inspiring communities into action; Farm to Work, an employee wellness program that provides fresh fruits and vegetables; and Getting Fit Texas!, used by community health workers to promote physical activity (Staples et al., n.d.).

Though national and state policy and legislation have recently improved, childhood obesity rates are still on the rise. Because there is no single solution to the childhood obesity epidemic, collaborating with multiple sectors instead of working as independent sectors will create more resources and opportunities to learn what is working well at both state and national levels. Thus, families, schools, community organizations, faith-based institutions, government agencies, media, and health care providers must collaborate to find strategies and solutions that will create healthier environments for children and adolescents (Wechsler, McKenna, Lee & Dietz, 2004).

Individual and Social Determinants of Health

This study examined individual and social factors that may influence obesity in Texas youth. An overview of each of these factors is presented in the following sections along with a review of how they were associated with obesity in the literature.

Body Mass Index

Growth charts from the Centers for Disease Control and Prevention (CDC, 2012b) were utilized to determine a child's BMI. Children and adolescents between the ages of 2–19 with a BMI at or above the 95th percentile for age are categorized as obese. Children between the 85th and 95th percentiles are categorized as overweight (Table 1; CDC, 2012b). Overweight is defined as having more body weight in relation to height; this weight can be from fat, muscle, bone, or water. Obesity is defined as having more body fat than needed (CDC, 2012c). Growth charts from the Centers for Disease Control and Prevention (2012c) are utilized to determine BMI-for-age-and-sex percentile. The CDC (2012c) utilizes the BMI-for-age-and-sex percentile because of body fat changes in children and youth and because of the difference in body fat between boys and girls.

The Centers for Disease Control and Prevention (2012c) recommend screening children beginning at age 2 for overweight and obesity using the BMI assessment. BMI is a reliable and inexpensive screening indicator for body fatness but is not a diagnostic tool. To determine comprehensively if a child or adolescent is overweight or obese, further assessments, such as measurements of skinfold thickness, are needed (CDC, 2012c). The AAP recommends that BMI be calculated, plotted, and tracked annually within the child's medical home (Levi et al., 2011). Collected and aggregated BMIs are

useful data to measure national health objectives, to determine the weight status of a student population, and to monitor policies and programs related to nutrition and physical activity (White House Task Force on Childhood Obesity, 2010). According to Doolen, Alpert, and Miller (2009), parents do not correctly perceive the weight of their overweight or obese children, nor do parents realize that their children may have weight issues. To help parents better identify any potential weight issues, several states and municipalities have required the provision of BMI screenings for parents and caretakers (White House Task Force on Childhood Obesity, 2010).

Race and Ethnicity

Several ethnic groups are disproportionately affected by higher rates of overweight and obesity (Braveman & Egerter, 2008; U.S. Department of Health and Human Services [USDHHS], 2010). Recent data continue to show that African American, Latino, American Indian, and Alaskan Native children and adolescents are the groups most affected by overweight, obesity, and chronic illnesses (CDC, 2012c; RWJF, 2010).

Unhealthy eating habits and lack of exercise have long been known to contribute to the childhood obesity epidemic, but recent research has shed light on other contributing causes of obesity, such as socioeconomic and ethnicity factors. Socioeconomic factors that can negatively impact health include low –income households or family income, lack of education, poor housing, unsafe neighborhoods, and lack of health care (Braveman & Egerter, 2008). In fact, researchers who participated in a large national cross-sectional study of the Monitoring the Future Survey (1998–2003) analyzed

by race and ethnicity and by socioeconomic status (SES) the prevalence in a group of students in Grades 8 and 10 of being overweight or at risk of being overweight (N = 39,011; Delva, Johnston, & O'Malley, 2007). These researchers concluded that nearly 25% of students in Grades 8 and 10 who participated in the study were at or above the 85th percentile and this percentage remained consistent throughout the duration of the study. In the Monitoring the Future Survey (1998–2003), Black and Hispanic youth were consistently at or above the 85th percentile at every SES (Delva et al., 2007).

Parental Education

The most powerful influence in children's lives is their parents (Ng, Anderson, McQuillen, & Yu, 2005; Wechsler, McKenna, Lee, & Dietz, 2004). Parents generally purchase food and create opportunities to increase physical activity (Ng et al., 2005). Decisions about food, activity, and television viewing most often occur at home (USDHHS, 2010).

All parents want the best for their children, but not all parents have the resources to create or maintain healthy lifestyles for their children (Braveman, Sadegh-Nobari & Egerter, 2008). In a study by Sonneville et al. (2009), 19 parents of overweight (BMI ≥ 85th percentile) children aged 5–17 years were part of a focus group to determine barriers in obesity prevention and recommendations to increase physical activity. Sonneville et al. (2009), concluded that weather, siblings, finances, time, neighborhood safety, preferences for sedentary activities, lack of affordable and accessible recreation facilities, and low caregiver motivation were all mentioned as barriers to preventive activities. Parents who participated in Sonneville et al.'s (2009) study also believed that the

environment and social barriers were in part responsible for unhealthy eating habits that were developed among their children.

According to Braveman and Egerter (2008), levels of parental education seem to impact health and longevity. Higher levels of education have been linked with longer lives, implying that people who graduated from college may expect to live at least 5 years longer than people who did not graduate from high school. Babies born to mothers with less than 12 years of schooling are nearly twice as likely to die before they turn 1 year old as opposed to babies of mothers who are college educated (Braveman & Egerter, 2008).

Researchers have suggested that intervention at an early age can break a vicious cycle of obesity to encourage children toward good health and productive adulthoods in the workforce (Braveman, Sadegh-Nobari, & Egerter, 2008). According to Braveman et al. (2008), one of the most effective ways to improve society's overall health potential is to improve social circumstances in childhood.

Lower levels of parental education may influence children's risks of being overweight. For example, parents may be less knowledgeable about nutrition and physical activity in the role of weight loss and control (Haas et al., 2003). However, according to Haas et al. (2003), parental education may be a less important factor in adolescents' risks of being overweight. Some explanations for this difference include the fact that adolescents have greater control of their food choices and are more knowledgeable about health and exercise. Adolescents may also receive information regarding weight from other sources, such as peers and media (Haas et al., 2003).

Low Household Income

Studies reveal that children who live with low-income families are 7 times as likely to be in poor or fair health, which is just the opposite for children in higher-income families (Braveman & Egerter, 2008). Braveman and Egerter (2008) suggested that people from lower-income families have a higher risk of obesity, overweight, and poor health because of environments that do not support healthy behaviors.

Children cannot choose their living environments or conditions, factors which can ultimately impact their health (Braveman & Egerter, 2008). Researchers consistently have suggested that children who live in environments that are socioeconomically disadvantaged have lower educational attainment and lower income jobs in adulthood than do children who live in environments that are socioeconomically advantaged (Braveman & Egerter, 2008). A child's health profile is a very strong predictor of their health as an adult (Braveman & Egerter, 2008).

Families who struggle financially and who have less access to fresh, high-quality, and affordable foods, may not be meeting their daily dietary needs, which can further raise rates of chronic diseases, such as cancer, cardiovascular disease, and diabetes (Prevention Institute for the Center for Health Improvement, n.d.). People who live in households with incomes of less than $15,000 are more likely than are people who live in households with incomes of over $50,000 to be obese and be diagnosed with a chronic illness, such as diabetes or asthma or at greater risk for other health problems due to their lack of exercise (Active Living By Design, n.d.). The most commonly cited barriers that people who live in low-income communities face include lack of transportation, unsafe

neighborhood and traffic conditions, lack of access to parks and recreational facilities, air pollution, lack of time and support for exercise and overall poor health (Active Living by Design, n.d.). Though the same barriers may exist for other communities with different income levels, these barriers are more prevalent in lower-income communities because low-income communities lack the resources to achieve solutions that allow for safer or cleaner neighborhoods, living closer to work, or paying for club memberships or recreational center activities (Active Living by Design, n.d.).

Parent Employment

In 2010, nearly 11% of children had one unemployed parent, which was more than double the rates that were recorded between 2007 and 2010 (Speer et al., 2011). African American children were twice as likely to have an unemployed parent as compared to their White counterparts (Speer et al., 2011). In 2009, the median household income was particularly low for Blacks ($33,982) and Latinos ($38,980) as opposed to Whites ($64,566), which hinders the health of those children (Speer et al., 2011). Texas is considered the second most food insecure state with 24.3% of children living in poverty, compared to the national rate of 20.0% (SAFB, 2009). In 2008–2010, the average of household food insecurity in Texas (18.8%) exceeded that of the United States (14.6%; Feeding America, 2012). The Texas average (6.9%) of very low food security, which is considered a severe range of food insecurity in which food intake and eating in some households by some members is reduced, also exceeded that of the United States in 2008–2010 (5.6%; Coleman-Jensen, Nord, Andrews, & Carlson, 2010).

Although most U.S. households have consistent access to food, a growing number of American households are experiencing food insecurity, meaning that their access to enough food is limited by lack of financial funds and resources (Nord et al., 2010). It is important to note that food insecurity in the United States is usually infrequent or episodic and is not usually chronic (Nord et.al, 2010). People who live in Hispanic (26.9%) and Black households (24.9%) and single women who are the heads of their households (36.6%) have substantially higher rates of food insecurity than do people who fall within the national average of 14.7% (Nord et.al, 2010).

In 1995, Dietz (1998) reported a proposed relationship between hunger and obesity, a proposition that has lead to research and discussion about the possibility of this relationship. A few researchers have suggested that there are possible associations between food insecurity and weight gain in children (Jyoti, Frongillo, & Jones, 2005). Other studies have had mixed results (Gundersen, Garasky, & Lohman, 2009). A study by Alaimo, Olson, and Frongillo (2001) revealed an increased prevalence of overweight and food insufficiency (described as inadequate food consumption due to lack of money) among girls between the ages of 8–16 who are from low-income, non-Hispanic families. In this study, girls from food-insufficient households were 3.5 times more likely to be overweight than were girls from food-sufficient households (Alaimo et al., 2001). Researchers concluded that women who are food insecure are more likely to be obese than are women who are food secure. However, this conclusion is not true for men (Larson & Story, 2010).

Food insecurity can contribute to weight gain because poor quality and inexpensive foods, which tend to be higher in calories and lower in nutrients, are often consumed by people who are food insecure (Casey et al., 2006; Holben, 2006; Larson & Story, 2010). Families who experience food insecurity may use survival skills such as (a) eating less variety and energy-dense foods; (b) receiving assistance through federal food assistance programs; (c) utilizing emergency food assistance from food pantries, kitchens, and shelters; and (d) adjusting the number of meals consumed, which can disrupt healthy eating patterns (Casey et al., 2006; Holben, 2006). Another possibility to explain weight gain in households that are food insufficient includes overeating when food is available (Casey et al., 2006).

In a study that was conducted in Texas among high school students from low-income families ($N = 500$), total daily calories were well below national recommendations, and poor eating patterns were similar to characteristics that food-insufficient households experience (Leal-Vasquez, Wyatt, & Love, 2007). Trevino et al., (2008) reported that fourth-grade students from low-income (< $20,400/year) households in Texas consumed poor quality diets and did not consume enough calories for proper growth and development. Students in Trevino et al.'s study consumed 1,588 kcal/day on average, which is below the national recommendation of 1,900 kcal/day. Sixty-eight percent of parents in Trevino et al.'s study had obtained a high school education or less (Trevino et al., 2008).

In 2009, the United States Department of Agriculture (USDA) conducted a household survey and concluded that 14.7% of U.S. households were food insecure,

meaning that these families had a difficult time providing enough food for all family members (Nord et. al, 2010). In the same study, approximately 5.7% of all U.S. households had "very low food security" (Nord et.al, 2010). Food insecurity was more than 4 times as prevalent in households with annual incomes 185% below the poverty line as well as in households with annual incomes that are even further below the poverty line because of job loss, divorce, or other unexpected events. According to the USDA's survey, 17.2 million children lived in food-insecure households in 2009. During that same year, 5.4 million children lived in households that were categorized as very low food security. The USDA's survey also concluded that one or more children were also subject to reduced food intake and to disrupted eating patterns at some time during 2009 (Nord et.al, 2010). Ninety-four percent of survey respondents reported that they could not afford to eat balanced meals, and 98% reported that they worried about food running out before they could buy more (Nord et.al, 2010).

State Assistance

Public schools feed over 31 million children most days a week (The National School Lunch Program [NSL], 2011). The NSL (2011) is a federally assisted program that operates in public, non-private schools and child care centers. The NSL (2011) provides low-cost and free meals that are healthy to children attending school. The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC, United States Department of Agriculture [USDA], (2005) is designed to assist women who are low-income, pregnant, breast-feeding, or non-breast-feeding postpartum and who are at nutritional risk as well as children under the age of 5 years old with healthy foods to

supplement household diets. In 2009, the WIC food package was improved to align with the Dietary Guidelines for Americans and the guidelines of the American Academy of Pediatrics for feeding infants, which included fruits, vegetables, and whole grains (Arons, 2011).

Families with household incomes that are 130% below the poverty line are eligible (along with other eligibility criteria) to receive food assistance through the Supplemental Nutrition Assistance Program (SNAP) benefits, formally known as the Food Stamp Program (Nord et al., 2010). Struggling families can also turn to emergency food assistance providers, which include food pantries and emergency kitchens (Nord et al., 2010). In the United States, periods of food insecurity are most often reported toward the end of the food stamp cycle, when food supplies are lower and even more inadequate in lower-income households (Dinour, Bergen & Yeh, 2007).

There is an assumption that federal food assistance programs, such as the SNAP and WIC, may contribute to the obesity. Ver Ploegm, Mancino, Lin, and Guthrie (2008) utilized data from the National Health and Nutrition Examination Surveys (NHANES) from 1976–2002 to examine the relationship between children's body weight and their participation in SNAP and WIC programs. Researchers in the study concluded that there was no evidence of a consistent relationship between childhood obesity and federal food assistance programs, such as SNAP and WIC (Ver Ploegm et al., 2008).

In another study by Gleason and Dodd, (2009), height and weight of 2,228 students were collected and a survey was utilized to determine if school meal programs contributed to obesity. Gleason and Dodd found no relationship over time between

participation and weight status. They concluded that school meal programs did not contribute to the increase in obesity (Gleason & Dodd, 2009).

Children's Health

Health Care

According to the American Academy of Pediatrics, children should have eight preventative health care visits in their first year, three visits in year 2 and at least one visit yearly from middle childhood to adolescence (USDHHS, 2011). Well-child visits help monitor children's overall health, assure immunizations are given and updated, and provide an opportunity for parents to receive nutritional guidance (USDHHS, 2011). Data from the Medical Expenditure Panel Survey (2001–2003) revealed that children who live in low-income households (< 250% below the federal poverty level) were more likely to have had a least one preventative care visit if they had public insurance rather than private insurance or were partly or fully uninsured for a year (Perry & Kenney, 2007). In the sample from the Medical Expenditure Panel Survey, 48% of children did not receive any clinical guidance on healthy eating or physical activity. Moreover, 41% of overweight children in the sample from the Medical Expenditure Panel Survey did not receive guidance to improve their health or weight (Perry & Kenney, 2007).

In 2009, 83.6% of non-Hispanic Black children were likely to receive a well visit within the past year, followed by 77.6% of non-Hispanic White children, 74.9% of Hispanic children, and 72.1% of non-Hispanic American Indian and Alaskan Native children (USDHHS, 2011).

Health Conditions

Preventive health care is critical to prevent chronic illness, such type 2 diabetes and heart disease as well as other long-term health problems. According to the American Heart Association (AHA, 2012), there is evidence to suggest that atherosclerosis or its precursors begin at a very early age and slowly evolve into adulthood. Over time, atherosclerosis can lead to coronary heart disease, a serious condition that is considered the primary cause of death in the United States (AHA, 2012).

In recent years, type 2 diabetes has increased among children and adolescents between the ages of 6–19 years (Copeland, Becker, Gottschalk & Hale, 2005; Trevino et al., 2004). Type 2 diabetes is a condition in which insulin is not properly used by the body (CDC, 2012d). This condition is usually associated with several factors that include older age, obesity, family history, physical inactivity, and race and ethnicity (CDC, 2012d). Obesity is a predominant risk factor and contributor to the development of type 2 diabetes (Copeland et al., 2005; Wang & Dietz, 2002). Children with high BMI can be at even greater risk for insulin resistance, which can lead to diabetes and other long-term medical problems (CDC, 2012d). Researchers at the CDC estimated in 2007 that 24 million Americans had diabetes. Nationally, it is estimated that over 215,000 people under the age of 20 are diabetic (National Diabetes Education Program, 2008).

Diabetes health care can be a financial burden, with the national cost of $174 billion dollars (2007, direct and indirect) (Texas Diabetes Institute [TDI], 2010). It is estimated that over 1 million Texans have been diagnosed with diabetes and that another half million remain undiagnosed (Texas Diabetes Council [TDC], 2009). Children of

African, Hispanic, Asian, or Native American decent have a higher incidence of type 2 diabetes (TDC, 2001). In addition, children with type 2 diabetes are usually overweight, obese, over 10 years of age, and in middle to late puberty (TDC, 2001).

In a longitudinal study of Texas students who lived with low-income families, who were predominantly Mexican American, and who were in the fourth grade, researchers concluded that the group was at greater risk for type 2 diabetes (Trevino et al., 2008). In this study, researchers concluded that of the 1,402 students, 6.8% (95) were found to have a high fasting glucose (at or above 100 mg/dl [.55 mmol/L]), and 39% had unacceptable fitness scores. Most students consumed below the national average intake of 1,588 kcal/day (~ 1,900 kcal is acceptable for this age group); 12.50% exceeded saturated fat, and 10% were below national recommendations for fiber intake.

Another condition commonly seen among children and youth in the United States is asthma, defined as a chronic lung disease (CDC, 2012e; Kirk & Li, 2009). Asthma has been associated with obesity in several studies (Wang & Dietz, 2002). According to the Youth Risk Behavior Surveillance Study of 2011, the prevalence of asthma history was higher among Black students (26.8%), followed by that of White (22.8%) and Hispanic students (20.3%; CDC, 2012f). According to the Texas Department of State Health Services, there were approximately 867,000 (13.6%) children with lifetime asthma and 586,000 (9.1%) children with reported current asthma in 2007 (Kirk & Li, 2009). Data from the Texas Emergency Department of Asthma Surveillance Program (2002–2007) revealed that the majority of patients seen in pediatric emergency care were children ages

1–14 years who were mostly male, African American, and uninsured (26%; Kirk & Li, 2009).

Mortality rates from asthma among African Americans are statistically significantly higher than any other racial or ethnic group (Kirk & Li, 2009). In general, children from lower-income communities experience more emergency care visits, hospital visits, and death from asthma (CDC, 2012e). Minority and lower-income individuals have an increased risk for pollution exposure and are, in turn, at higher risk for health issues, including asthma (National Prevention Council, 2011).

A study in 2003 revealed the risk of being diagnosed with asthma was increased by 52% among overweight and obese children and adolescents (Gilliland et al., 2003). Wang and Dietz (2002) analyzed hospital discharges of children and adolescents who were 6–17 years old between the years 1979–1999. In their findings, Wang and Dietz concluded that asthma, diabetes, and mental health disorders were frequently the principal diagnoses when obesity was listed as a secondary diagnosis. In the same study, rates of asthma as a factor in obesity-associated comorbidity increased from 5.9% in 1979–1981 to 8.1% in 1997–1999, and the frequency of asthma and obesity related discharges increased nearly 40% (Wang & Dietz, 2002).

Health Insurance

It is critical to prevent and treat obesity in childhood to reduce the risk of health complications in both childhood and adulthood. According to Haas et al. (2003), insurance status may be associated with the prevalence of being overweight among children and adolescents due to complex barriers and challenges that uninsured families

face to receive proper healthcare. Haas et al. (2003) concluded that lack of insurance was found to be positively associated with the prevalence of overweight among adolescents. In Haas et al.'s study, the rate of overweight for younger children was found to be more than 2 times greater than that for adolescents (26.9% vs. 11.2%; $p < .001$). In the same study, there were substantial differences in demographic characteristics by race, which could be viewed as ethnic disparities. Haas et al. (2003) reported that Blacks had the highest poverty rate and Latinos had the highest rate of being uninsured. Blacks, Latinos, and Asians had a higher prevalence of overweight. Some researchers have suggested that these disparities could be attributed to certain practices and beliefs as well as lifestyle and acculturation. According to Haas et al. (2003), language preference and the length of residency in the United States may be linked to a high BMI among Latinos (Haas et al., 2003). Likewise, Asian/Pacific Islanders are more overweight with the greater number of years of living in the United States (Haas et al. 2003).

Neighborhoods and Environments

Resources

Families living in poor neighborhoods with high crime and lack of grocery stores are believed to experience more health concerns that can contribute to both short- and long-term problems, including overweight and obesity (Braveman & Egerter, 2008). Lack of parks and walking paths and grocery stores that have a limited variety of fruits, vegetables, and whole grains can discourage children and families from staying physically active and purchasing affordable healthy foods (Braveman & Egerter, 2008; CDC, 2012b). Residents in lower-income areas may have to consume foods from

convenience stores or corner stores where fruit, vegetables, and whole grains are not readily available.

According to a report by the Food Trust, many Texans do not have equal access to fresh fruits, vegetables, and whole grains (Manon & Giang, 2010). Manon and Giang (2010) reported the difference in the number of national versus local supermarkets in Texas. Among all states, Texas has the lowest number of supermarkets per capita of any state in the country and is considered to have a high number of food deserts (Cole, 2012; Manon & Giang, 2010). In Texas, each supermarket can serve about 11,000 people, as opposed to the national average of one supermarket for every 8,620 people (Cole, 2011; Manon & Giang, 2010).

In a study by the University of Connecticut's Food Marketing Policy Center in 1995, grocery store information were analyzed across the United States in 21 major metropolitan areas in an effort to determine how low-income communities may differ from high income areas (Prevention Institute for the Center for Health Improvement, n.d.). The researchers in this study concluded that there were 30% fewer supermarkets in low-income areas than in higher-income areas. In the same study, residents did not own an automobile, which further complicated their access to healthier food choices. According to research by the Prevention Institute for the Center for Health Improvement (n.d.), urban areas experience more unequal access to quality supermarket foods, while rural areas often experience a lack of access to a grocery store. A lack of supermarkets in low-income areas limits food options, and residents are often limited to smaller neighborhood stores. Small convenient stores often have higher prices and offer less

food options than supermarkets. In addition, small stores, often have limited capacity for high volume, or large-scale wholesale produce, and often do not have space or equipment to properly store fresh fruits or vegetables. According to several studies prices at neighborhood markets exceed those at chain supermarkets by 76% but offer much lower quality foods. (Prevention Institute for the Center for Health Improvement, n.d.).

Poor transportation options is the single most vital issue that limits physical activities, such as walking, biking, and transit use by people in low-income communities (Active Living by Design, n.d.). In many communities, schools, roads, shopping centers, workplaces, and neighborhoods are more easily accessed by cars. For daily basic needs, a car is important for transportation (Active Living by Design, n.d.). Lack of transportation can also affect people's abilities to obtain medical care and educational training, which can affect their quality of life and also be a reason for their higher rates of unemployment (Active Living by Design, n.d.; Pucher & Renne, 2003). People from predominately African American neighborhoods have fewer opportunities for physical activity and are even more unlikely to have parks, green spaces, pools, or beaches (Powell et al., 2004).

Social Support

People who perceive their neighborhoods to be unsafe tend to be less physically active (Active Living by Design, n.d.). Access to safe places to play, such as school playgrounds (after school), improves the chances of children being more physically active, which is particularly beneficial in under-served communities (Farley et al., 2007; Leadership for Healthy Communities, 2009). Safety and access to facilities is also

reported as an issue that affects the physical activity of people from low-income communities. Researchers have suggested that having daily opportunities to walk or ride a bicycle from home to nearby schools, local parks, or workplaces increases the daily physical activity of youth (Leadership for Healthy Communities, 2009).

According to the American Academy of Pediatrics, individuals most at risk for low physical activity include children (mainly girls) who are ethnic minorities, preadolescents and adolescents, children who are living in poverty, residing in public housing or apartments or living in neighborhoods with limited facilities, poor climate, or safety concerns (Murray, LeBlanc, & Gomez, 2006). For example, in a national study in 1996, 31% of respondents who lived in low-income neighborhoods worried about safety in their neighborhoods, as opposed to those who lived in moderate-income neighborhoods (15%) and who enjoyed fewer barriers to physical activity (Active Living by Design, n.d.). Additionally, 40% of respondents in the low-income groups reported more exposure to crime (Active Living by Design, n.d.). Other studies indicate that fear and discrimination prevent ethnic and racial minorities from utilizing parks and recreational sites (Scott, 2002).

In 1998, over 3,000 Texans participated in a survey to determine the use of state parks and participation in outdoor recreational activities as well as the barriers and constraints to use and participation (Scott, 2002). Researchers concluded that individuals with economic constraints to visiting parks or recreational centers tended to be Hispanic and unemployed and reported lower levels of income and education (Scott, 2002). Respondents who reported lack of access to and information about parks and recreational

centers were also Hispanic and lower income and had small children at home. African Americans in this same study reported the lowest interest in visiting parks or recreational areas (Scott, 2002).

In a study of 1,194 telephone interviews with predominantly rural households, researchers concluded that neighborhood variables were much stronger predictors of physical activity than were community variables (Addy et al., 2004). In the study of phone interviews, neighborhood variables in physical activity included sidewalks, public recreational centers, and good neighborhoods. Community variables included walking and biking trails, recreational facilities, parks, playgrounds, sports fields, and places of worship. In the same study, barriers to physical activity included perception of untrustworthy neighborhoods, crime, loose dogs, and traffic issues (Addy et al., 2004).

Summary

Childhood obesity in the United States has reached epidemic proportions and has become a major national priority (Centers for Disease Control and Prevention [CDC], 2012a; The White House, n.d.; Wang & Dietz, 2002). The number of children who are living in poverty is also gaining much attention and concern. In Texas, 24.3% of children are living in poverty, a rate that exceeds the national rate of 20.0% (SAFB, 2009). Texas is considered the second most food insecure state and also has the highest number of food deserts (Manon & Giang, 2010; SAFB, 2009). Moreover, Texas has the lowest number of supermarkets per capita of any state in the country (Manon & Giang, 2010).

Researchers consistently suggest that families living in lower-income neighborhoods with high crime and lack of grocery stores are believed to experience

more health concerns that can contribute to health problems, including overweight and obesity (Braveman & Egerter, 2008 ; CDC, 2012a; WHO, 2012). Perception of unsafe neighborhoods also tends to hinder physical activity (Active Living by Design, n.d.). For children, having access to safe places to play, such as school playgrounds (afterschool) or other community sites, improves their chances of being more physically active, which is particularly beneficial in under-served communities (Farley et al., 2007; Leadership for Healthy Communities, 2009).

Though national and state policies and legislation regarding childhood obesity have recently improved, there is still a need to seek solutions to the problem of obesity that have multilevel approaches and that are sustainable. Researchers suggest that the best way to improve health is to empower people to choose health by strengthening their capacity and by removing the barriers to those choices (Braveman & Egerter, 2008). Collaborating with multiple sectors will create stronger resources and more opportunities to learn about which strategies are working well at national, state, and local levels. Thus, policy makers must work to enhance state-level and community-based policies and interventions that address overweight and obesity, by closing any potential gaps that hinder communities from improving their overall health and reversing obesity.

CHAPTER III

METHODOLOGY

The study employed a quantitative design using secondary data from the National Survey of Children's Health (NSCH) in order to identify factors that contribute to obesity in children living across the state of Texas. The study was ex-post facto using population-based cross-sectional data.

Population and Sample

The nationally representative data from the NSCH was collected by telephone interviews of the parents/guardians of 91,642 children aged 3-17 living in households across the United States. Secondary data was collected from 1,725-1,932 interviews in each state. The total number of cases completed from Texas numbered 1,805. Results were weighted to represent the population of non-institutionalized children ages 0-17 across the nation and in each state.

In the current study, data from children in Texas between 10-17 years of age were considered for inclusion in the study. Three to 9 year old study participant data was not included in this study due to the protocol of not obtaining height or weights from the parent or guardian. A total of 847 respondents for children aged 10-17 in Texas qualified for the study. Of these, 714 respondents presented both height and weight information, allowing the calculation of body mass index (BMI) and responses for all primary study variables. Minimal demographic information was missing for these participants (less than 10%), with the exception of father education, which was missing in approximately

25% of responses. The majority of missing data was due to the father's absence from the home. Analysis including the demographic variables was conducted only on participants who gave all necessary demographic information.

Protection of Human Participants

An Institutional Review Board (IRB) exempt review application was submitted and approved by the Texas Woman's University IRB process prior to data analysis. Data was collected by the National Survey of Children's Health (NSCH) and was provided with no identifying information. Participants were identified by code numbers assigned by a computer.

Instrumentation

A subset of data from the NSCH was used for the current study. The overall purpose of the NSCH was to estimate the prevalence of physical, emotional, and behavioral child health indicators along with information about the child's family background and neighborhood environment. The study was funded through the Maternal and Child Health Bureau (MCHB) of the Health Resources and Services Administration (HRSA).

The NSCH data has been used to provide baseline estimates for both federal and state Title V Maternal and Child Health performance measures, MCHB companion objectives for Healthy People 2010, and for each state's 5-year Title V Needs Assessment. The survey data has provided critical information to help guide policy makers, researchers, advocates, stakeholders about children, families, and their neighborhoods.

The survey included a total of 100 questions, including 70 child health measures. The target interview time was 25 minutes, not including the age screening and informed consent process. The questionnaire was developed into eight domains and divided into 11 sections. The eight domains were selected for their epidemiology and policy importance, which included (a) demographics, (b) physical and mental health status, (c) health insurance, (d) health care utilization and access to health care, (e) medical home, (f) family function, (g) parent's health, and (h) neighborhood characteristics. The 11 content areas included (a) age-eligible screening and demographic characteristics, (b) health and functional status, (c) health insurance coverage, (d) health care access and utilization, (e) medical home, (f) early childhood (0-5 years only), (g) middle childhood and adolescence (6-17 years only), (h) family functioning, (i) parental health, (j) neighborhood characteristics, and (k) additional demographics characteristics (i.e., ethnicity, parent education level, and parent employment/income). In addition, age-specific modules were used to obtain developmentally appropriate aspects of child health and well-being.

Data Collection Procedure

NSCH utilized the already established National Immunizations Survey (NIS) system, which is a large-scale random-digit-dialed telephone survey that uses computer-assisted telephone interview technology to contact households. The National Opinion Research Center (NORC) at the University of Chicago administered all aspects of survey operations (including testing the instrument, recruiting and training interviewers, conducting the interviews, and compiling the data) and worked with NCHS sponsors to

establish parameters for sample size, questionnaire design, and other requirements of the survey.

The collection period occurred from April 2007 through July 2008 and was conducted in both English and Spanish. Telephone numbers were called at random with the goal of identifying households with one or more children less than 18 years of age. If one or more children were living in the household, the interviewer asked the ages of all children living in the household. If no children were living in the household, the interviewer ended the call. The adult that knew the most about the child's overall health and health care was asked the interview questions. In each household, one child was randomly selected as the subject of the interview.

Variables Used in the Study

Although the full survey included a total of 100 items, only a subset of the items were used in the current study. These were items that pertained to child health, insurance coverage, poverty, neighborhood/environment, BMI, and several demographic variables found to be related to these topics in the literature. Specifically, the demographics of interest in the current study included child gender, child age, child ethnicity, level of mother's education, level of father's education, and whether at least one parent in the household had full-time employment. The specific items related to child health, health insurance coverage, poverty, and neighborhood/ environment were: (a) health insurance (health insurance/coverage meets needs, consistency of coverage over past year, and type of coverage); (b) child health (number of preventative medical care visits, place of healthcare, child health condition, delayed or not received healthcare, asthma, and

diabetes); (c) poverty (cash assistance from state, food stamps, free or reduced school breakfast or lunch, and poverty level); (d) neighborhood environments (child safety in neighborhood, neighborhood people helping each other, reliability of neighbors, neighborhood recreation center, neighborhood sidewalks, neighborhood playground, and poorly-kept housing); and (e) demographic variables including parent education level, ethnicity, and household work status. BMI is a screening tool used to determine appropriate weight using the child's current height, weight, gender and age (CDC, 2012b).

Data Analysis

Preliminary data analysis was conducted using IBM SPSS Statistics, Version 19 and was conducted in order to test the relationships among the demographic variables as well as the relationships between the demographic and dependent variables. Measures of central tendency, including means, standard deviations, frequencies, and percentages were used to describe the sample. Relationships among categorical demographic variables were examined using cross tabulations with Pearson's chi square, and Cramer's V was used to check the strength of the relationship between variables. Continuous variables were tested for normality using the Kolmogorov-Smirnov test of normality. Relationships among continuous variables were tested using Pearson's product moment correlations. One-way analysis of variance (ANOVA) was conducted to test for differences between the levels of categorical variables on the continuous dependent variables. In addition, homogeneity of variance was tested using Levene's Test for Equality of Variances. The analysis was computed for all study participants ($N = 714$).

For the primary analysis, Hypothesis 1-3 was tested using a covariance based structural equation model (SEM) and LISREL 8.8. The steps of the analysis included: (a) confirmatory factor analysis (CFA) on each latent construct, (b) a measurement model tested on all latent constructs at the same time, (c) testing of the full SEM, and (d) the testing of the model with modification indices where indicated by the findings. Several fit indices, including the adjusted chi square, RMSEA, CFI, SRMR, and GFI were reported. Several characteristics of SEM made it the preferred methodology for this analysis. First, SEM allows the researcher to identify either a causal or exploratory relational model based on what is already known through current knowledge, theory or hypotheses (Byrne, 2001; Kline, 2005). The researcher can then specify which relationship is of interest based on what is already known about certain components related to the research problem. Hypothesis 4 was tested using multiple logistic regression analysis in SPSS.

CHAPTER IV

RESULTS

Few studies in the literature simultaneously examine multiple variables that may affect childhood obesity. The purpose of this quantitative research is to examine the association of poverty, child health, health insurance, and neighborhood environments with childhood obesity as a health outcome in Texas. The purpose of Chapter 4 is to present the results of the research as outlined by the methodology in Chapter 3. The secondary data was collected using a survey instrument to answer the following research null hypotheses in this study:

1. Neighborhood and environmental factors will not significantly mediate the relationship between health care and insurance factors and BMI of Texas children.
2. Neighborhood and environmental factors will not significantly mediate the relationship between child health factors and BMI of Texas children.
3. Neighborhood and environmental factors will not significantly mediate the relationship between poverty factors and BMI of Texas children.
4. The variables related to demographics, health care, childhood health, poverty, and neighborhood and environment will not be predictive of obesity in Texas children.

Preliminary Analyses

Preliminary analyses were conducted to test the relationships among the demographic variables as well as the relationships between the demographic and dependent variables. Measures of central tendency, including means and standard deviations, as well as frequencies and percentages were used to describe the sample. Relationships among categorical demographic variables were examined using crosstabulations with Pearson's chi square and Cramer's V. Continuous variables were tested for normality using the Kolmogorov-Smirnov test of normality. Relationships among continuous variables were tested using Pearson's product moment correlations. One-way analysis of variance (ANOVA) tests were conducted to test for differences between the levels of categorical variables on the continuous dependent variables. In addition, homogeneity of variance was tested using Levene's Test for Equality of Variances. The analysis was computed for all study participants ($N = 714$).

Demographic Descriptives

Table 1 shows the frequencies and percentages for categorical demographic variables. The sample of this study included 714 participants. The sample was roughly evenly split between genders, with slightly more males (52.7%) than females (47.1%). The majority of participants were Hispanic (44.5%), followed closely by Caucasian (38.4%). There were fewer African American participants (11.2%) and multi/other, non-Hispanic participants (5.5%). Also, 0.4% of the sample chose not to report their race. For mother's and father's education, the majority of participants indicated that their mothers and fathers had more than a high school education (61.5% and 53.2%,

respectively). A large majority of participants (91.2%) indicated that at least one of their parents was employed full time. Nearly, 70% of the participants were not overweight or obese.

Table 1

Frequencies and Percentages for Categorical Demographic Variables

	Frequency	%
Gender		
Male	376	52.7
Female	336	47.1
Refused	2	.3
Ethnicity		
Hispanic	318	44.5
Caucasian	274	38.4
African American	80	11.2
Multi/Other, Non-Hispanic	39	5.5
Don't Know/Refused	3	.4
Mother's Education		
Less than High School	86	12.0
High School	138	19.3
More than High School	439	61.5
Don't Know	4	.6
System	47	6.6
Father's Education		
Less than High School	68	9.5
High School	83	11.6
More than High School	380	53.2
Don't Know	6	.8
Refused	1	.1
System	176	24.6

(Continued)

	Frequency	%
At Least One Parent Employed Full Time		
No	62	8.7
Yes	651	91.2
Don't Know	1	.1
BMI Classification		
Not Overweight/Obese	494	69.2
Overweight/Obese	220	30.8

Note. Frequencies not summing to $N = 714$ indicate missing data.

As shown in Table 2, the average age was just under 14 years with a range of 10-17 years ($M = 13.80$, $SD = 2.24$). BMI ranged from 10.34 to 51.87 ($M = 21.85$, $SD = 5.37$).

Table 2

Means and Standard Deviations for Continuous Demographic Variables

	N	Mean	*SD*	Min	Max
Age	714	13.80	2.24	10.00	17.00
BMI	714	21.85	5.37	10.34	51.87

Relationships among Demographics Variables

Cross-tabulations with Pearson's chi-square were computed between ethnicity and other categorical variables (see Table 3). A significant relationship was found between ethnicity and mother's education, $\chi^2(2) = 98.06$, $p < .001$, Cramer's $V = .28$. A greater proportion of Hispanics (24.5%) indicated that their mothers completed less than a high school education, compared to the proportion of Caucasians (2.7%) and African Americans (6.0%) who indicated the same. In addition, a greater proportion of African Americans (34.3%) indicated that their mothers were high school graduates, compared to the proportion of Caucasians (12.4%) and Hispanics (26.0%) who indicated the same. Finally, a greater proportion of Caucasians (84.9%) indicated that their mothers completed more than a high school education, as compared to the proportion of Hispanics (49.0%) and African Americans (59.7%) who indicated the same.

A significant relationship was found between ethnicity and father's education, $\chi^2(2) = 78.34$, $p < .001$, Cramer's $V = .28$. A greater proportion of Hispanics (25.6%) indicated that their fathers completed less than a high school education, compared to the proportion of Caucasians (3.3%) and African Americans (5.6%) who indicated the same. A smaller proportion of Caucasians (9.6%) indicated that their fathers had a high school education compared to the proportions of African Americans (22.2%) and Hispanics (22.9%) who indicated the same. Finally, a greater proportion of Caucasians (87.1%) indicated that their fathers had more than a high school education, compared to the proportions of Hispanics (51.6%) and African Americans (72.2%) who indicated the same (see Table 3).

Table 3

Frequencies and Percentages for Mother's Education, Father's Education, Household Work Status, and BMI Classification by Ethnicity

	Hispanic		Caucasian		African American			
	n	%	*n*	%	*n*	%	χ^2	*p*
Mother's Education							98.06	< .001
Less than High School	73	24.5	7	2.7	4	6.0		
High School	79	26.0	32	12.4	23	34.3		
More than High School	146	49.0	219	84.9	40	59.7		
Father's Education							78.34	< .001
Less than High School	57	25.6	8	3.3	2	5.6		
High School	51	22.9	23	9.6	8	22.2		
More than High School	115	51.6	209	87.1	26	72.2		
At Least One Parent Employed Full Time							18.93	< .001
No	42	13.2	9	3.3	10	12.5		
Yes	275	86.8	265	96.7	70	87.5		
BMI Classification							37.97	< .001
Not Overweight/Obese	186	58.5	224	81.8	51	63.7		
Overweight/Obese	132	41.5	50	18.2	29	36.3		

Note. Findings for cells with $n < 5$ should be interpreted with caution.

Additionally, a significant relationship was found between ethnicity and full-time employment, $\chi^2(2) = 18.93$, $p < .001$, Cramer's $V = .16$. A greater proportion of Caucasians (96.7%) indicated that at least one parent was employed full time, as

compared to the proportions of Hispanics (86.8%) and African Americans (87.5%) who indicated the same. A significant relationship was found between ethnicity and BMI classification, $\chi^2(2) = 37.97$, $p < .001$, Cramer's $V = .23$. A greater proportion of Caucasians (81.8 %) were not overweight or obese, compared to the proportions of Hispanics (58.5%) and African Americans (63.7%) participants who were not obese. In addition, a greater proportion of Hispanic participants (41.5%) were overweight or obese, compared to the proportions of Caucasians (18.2%) and African Americans (36.3%) who were obese (see Table 3).

Cross-tabulations with Pearson's chi-square were computed between mother's education and other categorical variables (see Table 4). A significant relationship was found between mother's education and ethnicity, $\chi^2(2) = 98.06$, $p < .001$, Cramer's $V = .28$. A greater proportion of participants whose mothers completed less than a high school education were Hispanic (86.9%), compared to the proportions of those whose mothers had a high school education (59.0%) and to those whose mothers had more than a high school education (36.0%). In addition, a greater proportion of participants whose mothers completed more than a high school education were Caucasian (54.1%), compared to the proportion of those whose mothers had a high school education (23.9%) and to those whose mothers had less than a high school education (8.3%). Finally, a greater proportion of participants whose mothers had a high school education were African American (17.2%), compared to the proportions of those whose mothers had less than a high school education (4.8%) and those whose mothers had more than a high school education (9.9%).

Table 4

Frequencies and Percentages for Ethnicity, Father's Education, Household Work Status and BMI Classification by Mother's Education

	Less than High School		High School		More than High School			
	n	%	*n*	%	*n*	%	χ^2	*p*
Ethnicity							98.06	< .001
Hispanic	73	86.9	79	59.0	146	36.0		
Caucasian	7	8.3	32	23.9	219	54.1		
African American	4	4.8	23	17.2	40	9.9		
Father's Education							339.72	< .001
Less than High School	44	66.7	9	10.1	11	3.1		
High School	10	15.2	48	53.9	22	6.3		
More than High School	12	18.2	32	36.0	318	90.6		
At Least One Parent Employed Full Time							31.79	< .001
No	16	18.8	17	12.3	15	3.4		
Yes	69	81.2	121	87.7	424	96.6		
BMI Classification							20.47	< .001
Not Overweight/Obese	43	50.0	93	67.4	326	74.3		
Overweight/Obese	43	50.0	45	32.6	113	25.7		

A significant relationship was found between mother's and father's levels of education, $\chi^2(2) = 399.72$, $p < .001$, Cramer's $V = .57$. A greater proportion of participants whose mothers had less than a high school education also had fathers who

had less than a high school education (66.7%), compared to the proportions of those whose mothers had a high school education (10.1%) and to those whose mothers had more than a high school education (3.1%). In addition, a greater proportion of participants whose mothers had a high school education (59.0%) also had fathers who had a high school education (53.9%), compared to the proportions of those whose mothers had less than a high school education (15.2%) and to those whose mothers had more than a high school education (6.3%). Finally, a greater proportion of participants whose mothers had more than a high school education also had fathers who had more than a high school education (90.6%), compared to the proportions of those whose mothers had a high school education (36.0%) and of those whose mothers had less than a high school education (18.2%; see Table 4).

A significant relationship was found between mother's education and full-time parental employment, $\chi^2(2) = 31.79$, $p < .001$, Cramer's $V = .21$. A greater proportion of participants whose mothers completed more than a high school education indicated that at least one of their parents was employed full time (96.6%), compared to the proportions of those whose mothers had a high school education (87.7%) and of those whose mothers had less than a high school education (81.2%; see Table 4).

A signification relationship was found between mother's education and BMI classification, $\chi^2(2) = 20.47$, $p < .001$, Cramer's $V = .17$ (see Table 4). A greater proportion of participants whose mothers had more than a high school education were not overweight or obese (74.3%), compared to the proportions of those whose mothers had a

high school education (67.4%) and those whose mothers had less than a high school education (50.0%).

Cross-tabulations with Pearson's chi-square were computed between mother's education and other categorical variables (see Table 5). A significant relationship was found between father's education and ethnicity, $\chi^2(2) = 78.34$, $p < .001$, Cramer's $V = .28$. A greater proportion of participants whose fathers had less than a high school education were Hispanic (85.1%), compared to the proportions of those whose fathers had a high school education (62.2%) and of those whose fathers had more than a high school education (32.9%). In addition, a greater proportion of participants whose fathers had more than a high school education were Caucasian (59.7%), compared to the proportions of those whose fathers had a high school education (28.0%) and of those whose fathers had less than a high school education (11.9%). A smaller proportion of participants whose fathers had less than a high school education (3.0%) were African Americans, compared to the proportion of those whose fathers had a high school education (9.8%).

Table 5

Frequencies and Percentages for Ethnicity, Mother's Education, Household Work Status, and BMI Classification by Father's Education

	Less than High School		High School		More than High School			
	n	%	*n*	%	*n*	%	χ^2	*p*
Ethnicity							78.34	< .001
Hispanic	57	85.1	51	62.2	115	32.9		
Caucasian	8	11.9	23	28.0	209	59.7		
African American	2	3.0	8	9.8	26	7.4		
Mother's Education							339.72	< .001
Less than High School	44	68.8	10	12.5	12	3.3		
High School	9	14.1	48	60.0	32	8.8		
More than High School	11	17.2	22	27.5	318	87.8		
At Least One Parent Employed Full Time							20.05	< .001
No	9	13.2	7	8.4	8	2.1		
Yes	59	86.8	76	91.6	372	97.9		
BMI Classification							37.83	< .001
Not Overweight/Obese	30	44.1	55	66.3	301	79.2		
Overweight/Obese	38	55.9	28	33.7	79	20.8		

A significant relationship was found between father's education and mother's education, $\chi^2(2) = 339.72$, $p < .001$, Cramer's $V = .57$ (see Table 5). A greater proportion of participants whose fathers completed less than a high school education also had mothers who completed less than a high school education (68.8%), compared to the proportions of those whose fathers had a high school education (12.5%) or those whose fathers had more than a high school education (3.3%). In addition, a greater proportion of participants whose fathers completed high school also had mothers who completed high school (60%), compared to the proportions of those whose fathers had less than a high school education (14.1%) or those whose fathers had more than a high school education (8.8%). Finally, a greater proportion of participants whose fathers completed more than a high school education also had mothers who completed more than a high school education (87.8%), compared to the proportions of those whose fathers had a high school education (27.5%) and those whose fathers had less than a high school education (17.2%).

A significant relationship was found between father's education and full-time parental employment, $\chi^2(2) = 20.05$, $p < .001$, Cramer's $V = .19$ (see Table 5). A greater proportion of participants whose fathers had more than a high school education indicated that at least one of their parents was employed full time (97.9%), compared to the proportions of those whose fathers had a high school education (91.6%) and those whose fathers had less than a high school education (86.8%).

A signification relationship was found between father's education and BMI, $\chi^2(2) = 37.83$, $p < .001$, Cramer's $V = .26$ (see Table 5). A greater proportion of

participants whose fathers had more than a high school education was not overweight or obese (79.2%), compared to the proportions of those whose fathers had a high school education (66.3%) and those whose fathers had less than a high school education (44.1%).

Cross-tabulations with Pearson's chi-square were computed between household work status and other categorical variables (see Table 6). A significant relationship was found between household work status and ethnicity, $\chi^2(2) = 18.93$, $p < .001$, Cramer's $V = .16$. A greater proportion of participants without at least one full-time employed parent were Hispanic (68.9%), compared to the proportion of those with at least one parent who was employed full time (45.1%). In addition, a greater proportion of participants with at least one full-time employed parent were Caucasian (43.4%), compared to the proportion of those without at least one parent who was employed full time (14.8%). Finally, a greater proportion of participants without at least one full-time employed parent were African American (16.4%), compared to the proportion of those with at least one parent who was employed full time (11.5%).

Table 6

Frequencies and Percentages for Ethnicity, Mother's Education, Father's Education, and BMI Classification by Household Work Status

	No		Yes			
	n	%	*n*	%	χ^2	*p*
Ethnicity					18.93	< .001
Hispanic	42	68.9	275	45.1		
Caucasian	9	14.8	265	43.4		
African American	10	16.4	70	11.5		
Mother's Education					31.79	< .001
Less than High School	16	33.3	69	11.2		
High School	17	35.4	121	19.7		
More than High School	15	31.3	424	69.1		
Father's Education					20.05	< .001
Less than High School	9	37.5	59	11.6		
High School	7	29.2	76	15.0		
More than High School	8	33.3	372	73.4		
BMI Classification					15.93	< .001
Not Overweight/Obese	29	46.8	464	71.3		
Overweight/Obese	33	53.2	187	28.7		

A significant relationship was found between household work status and mother's education, $\chi^2(2) = 31.79$, $p < .001$, Cramer's $V = .21$ (see Table 6). A greater proportion of participants without at least one parent employed had mothers who had less than a high school education (33.3%), compared to the proportion of those with at least one parent who was employed full time (11.2%). In addition, a greater proportion of participants without at least one parent employed full time had mothers who had a high school education (35.4%), compared to the proportion of those with at least one parent who was employed full time (19.7%). Finally, a greater proportion of participants with at least one parent employed full time had mothers who had more than a high school education (69.1%), compared to the proportion of those without at least one parent who was employed full time (31.3%).

Additionally, a significant relationship was found between household work status and father's education, $\chi^2(2) = 20.05$, $p < .001$, Cramer's $V = .19$ (see Table 6). A greater proportion of participants without at least one parent employed full time had fathers who had less than a high school education (37.5%), compared to the proportion of those with at least one parent employed full time (11.6%). A greater proportion of participants without at least one parent employed full time had fathers who had a high school education (29.2%), compared to the proportion of those with at least one parent who was employed full time (15.0%). Finally, a greater proportion of participants with at least one parent employed full time had fathers who had more than a high school education (73.4%), compared to the proportion of those without at least one parent employed full time (33.3%). A significant relationship was found between household

work status and BMI classification, $\chi^2(2) = 15.93$, $p < .001$, Cramer's $V = .14$. A greater proportion of participants without at least one parent employed full time were overweight or obese (53.2%) compared to the proportion of those with at least one parent employed full time (28.7%).

Cross-tabulations with Pearson's chi-square were computed between BMI classification and other categorical variables (see Table 7). A significant relationship was found between BMI classification and ethnicity, $\chi^2(2) = 37.97$, $p < .001$, Cramer's $V = .23$. A greater proportion of participants who were overweight or obese were Hispanic (62.6%), compared to the proportion of those who were not overweight or obese (40.3%). In addition, a greater proportion of participants who were not overweight or obese were Caucasian (48.6%), compared to the proportion of participants who were overweight or obese (23.7%).

A significant relationship was found between BMI classification and mother's education, $\chi^2(2) = 20.47$, $p < .001$, Cramer's $V = .17$ (see Table 7). A greater proportion of participants who were overweight or obese had mothers who had less than a high school education (21.4%), compared to the proportion of participants who were not overweight or obese (9.3%). In addition, a greater proportion of participants who were not overweight or obese had mothers who had more than a high school education (70.6%), compared to the proportion of participants who were overweight or obese (56.2%).

Table 7

Frequencies and Percentages for Ethnicity, Mother's Education, Father's Education, and Household Work Status by BMI Classification

	Not Overweight/Obese		Overweight/Obese			
	n	%	*n*	%	χ^2	*p*
Ethnicity					37.97	< .001
Hispanic	186	40.3	132	62.6		
Caucasian	224	48.6	50	23.7		
African American	51	11.1	29	13.7		
Mother's Education					20.47	< .001
Less than High School	43	9.3	43	21.4		
High School	93	20.1	45	22.4		
More than High School	326	70.6	113	56.2		
Father's Education					37.83	< .001
Less than High School	30	7.8	38	26.2		
High School	55	14.2	28	19.3		
More than High School	301	78.0	79	54.5		
At Least One Parent Employed Full Time					15.93	< .001
No	29	5.9	33	15.0		
Yes	464	94.1	187	85.0		

A significant relationship was found between BMI classification and father's education, $\chi^2(2) = 37.83$, $p < .001$, Cramer's $V = .26$ (see Table 7). A greater proportion of participants who were overweight or obese had fathers who had less than a high school education (26.2%), compared to the proportion of participants who were not overweight

or obese (7.8%). In addition, a greater proportion of participants who were overweight or obese had fathers who had a high school education (19.3%) compared to the proportion of participants who were not overweight or obese (14.2%). Finally, a greater proportion of participants who were not overweight or obese had fathers who had more than a high school education (78.0%), compared to the proportion of participants who were overweight or obese (54.5%).

A significant relationship was found between BMI classification and household work status, $\chi^2(2) = 15.93$, $p < .001$, Cramer's $V = .14$ (see Table 7). A greater proportion of participants who were overweight or obese did not have at least one parent who was employed full time (15.0%), compared to the proportion of participants who were not obese or overweight (5.9%). In addition, a greater proportion of participants who were not overweight or obese had at least one parent who was employed full time (94.1%), compared to the proportion of participants who were overweight or obese (85.0%).

Analyses of Variance (ANOVAs)

A series of one-way ANOVAs were conducted to test for differences in age by ethnicity, mother's education, father's education, household work status, and BMI (see Table 8). There was a significant difference in age by BMI classification, $F(1, 713) = 9.00$, $p = .003$. Participants who were not overweight or obese ($M = 13.97$, $SD = 2.22$) were older than participants who were overweight or obese ($M = 13.43$, $SD = 2.25$). There were no significant differences in age for ethnicity, mother's education, father's education, and household work status.

Table 8

Means and Standard Deviations for Age by Ethnicity, Mother's Education, Father's Education, Household Work Status, and BMI Classification

	n	Mean	*SD*	*F*	*p*
Ethnicity				.75	.471
Hispanic	318	13.68	2.20		
Caucasian	274	13.89	2.29		
African American	80	13.64	2.15		
Mother's Education				.75	.475
Less than High School	86	13.58	2.08		
High School	138	13.72	2.22		
More than High School	439	13.88	2.27		
Father's Education				.37	.691
Less than High School	68	13.91	2.16		
High School	83	13.64	2.23		
More than High School	380	13.85	2.25		
At Least One Parent Employed Full Time				.01	.936
No	62	13.82	2.45		
Yes	651	13.80	2.23		
BMI Classification				9.00	.003
Not Overweight/Obese	494	13.97	2.22		
Overweight/Obese	220	13.43	2.25		

Note. The sum of squares used for these analyses was type III due to unequal cell sizes.

A series of one-way ANOVAs were conducted to test for differences in BMI by ethnicity, mother's education, father's education, and household work status (see Table 9). There was a significant difference in BMI classification by ethnicity, $F(2, 671) = 15.21$, $p < .001$. Participants who were Caucasian had lower BMIs ($M = 20.54$, $SD = 4.34$) than did both Hispanics ($M = 22.76$, $SD = 5.89$) and African Americans ($M = 23.07$, $SD = 5.79$). There was a difference in BMI classification by mother's education, $F(2, 662) = 10.40$, $p < .001$. Participants whose mothers had more than a high school education ($M = 21.16$, $SD = 4.82$) had lower BMIs than those whose mothers had less than a high school education ($M = 23.79$, $SD = 6.80$).

There was a significant difference in BMI classification by father's education, $F(2, 530) = 12.84$, $p < .001$. Participants whose fathers had more than a high school education ($M = 20.84$, $SD = 4.66$) had lower BMIs than those whose fathers had less than a high school education ($M = 24.05$, $SD = 6.05$). There was a difference in BMI classification by household work status, $F(1, 712) = 18.75$, $p < .001$. Participants who had at least one parent who was employed full time had lower BMIs ($M = 21.58$, $SD = 5.13$) than those who did not have at least one parent who was employed full time ($M = 24.63$, $SD = 6.88$).

Table 9

Means and Standard Deviations for BMI by Ethnicity, Mother's Education, Father's Education, and Household Work Status

	n	Mean	*SD*	*F*	*p*
Ethnicity				15.21	< .001
Hispanic	318	22.76	5.89		
Caucasian	274	20.54	4.34		
African American	80	23.07	5.79		
Mother's Education				10.40	< .001
Less than High School	86	23.79	6.80		
High School	138	22.56	6.00		
More than High School	439	21.16	4.82		
Father's Education				12.84	< .001
Less than High School	68	24.05	6.05		
High School	83	22.23	5.72		
More than High School	380	20.84	4.66		
At Least One Parent Employed Full Time				18.75	< .001
No	62	24.63	6.88		
Yes	651	21.58	5.13		

Note. The sum of squares used for these analyses was type III due to unequal cell sizes.

Descriptives of Survey Items

The frequencies and percentages of all categorical survey variables are displayed in Table 10. The majority of children (85.7%) who participated in this sample had health insurance. Nearly 80% of the participants (78.2%) indicated that they had been consistently insured throughout the past year. The majority of participants (63.6%) had private health insurance, compared to the proportion who had public insurance (22.1%) and those who were uninsured (14.3%). The majority of participants reported that they used a doctor's office (71.8%) for care, followed by a clinic or health center (17.8%). A majority of participants (91.6%) said they had delayed or not received health care. A majority of participants reported that their children and youth did not have asthma (90.8%) or diabetes (99.3%). Most participants did not receive cash assistance (98.0%), food stamps (87.7%), or free or reduced school meals (68.5%). A greater proportion of the participants (61.8%) had access to a recreation center. The majority of participants (81.7%) said that there are sidewalks in their neighborhood. Nearly 87.1% of participants did not describe their housing environment to be poorly kept. The majority of participants (83.8%) indicated that there was a park or playground in their neighborhood.

The research variable 'place of health care' was categorized into four groups for analysis. Hospital emergency room and hospital outpatient department were categorized into one group called hospital emergency room or other (n = 28). Mexico and other locations outside the United States, some other place, not one place most often, telephone hotline, and nurse advice line were categorized into one group called Other/Not one place

most often (n = 46). The clinic or health center group remained the same (n = 127), and the doctor's office group remained the same (n = 513).

Table 10

Frequencies and Percentages of Categorical Survey Items

	Frequency	%
Does the Child Have Health Insurance?		
No	102	14.3
Yes	612	85.7
Consistency of Insurance Coverage During Past 12 Months		
Currently Uninsured/Periods No Coverage During Year	156	21.8
Consistently Insured Throughout Past Year	558	78.2
Type of Insurance Coverage		
Currently Uninsured	102	14.3
Public Insurance (i.e. Medicaid or SCHIP)	158	22.1
Private Health Insurance	454	63.6
Place of Health Care		
Doctor's Office	513	71.8
Hospital Emergency Room	12	1.7
Hospital Outpatient Dept.	16	2.2
Clinic or Health Center	127	17.8
Mexico/Other Non-US Locations	2	.3
Some Other Place	1	.1
Not One Place Most Often	41	5.7
Telephone Hotline, Nurse Advice Line	2	.3
Delayed/Not Received Health Care		
No	60	8.4
Yes	654	91.6

(continued)

	Frequency	%
Asthma		
No	648	90.8
Yes	66	9.2
Diabetes		
No	709	99.3
Yes	5	.7
Cash Assistance		
No	700	98.0
Yes	14	2.0
Food Stamps		
No	626	87.7
Yes	88	12.3
Reduced Cost/Free School Meals		
No	489	68.5
Yes	225	31.5
Recreation Center		
No	273	38.2
Yes	441	61.8
Sidewalks		
No	131	18.3
Yes	583	81.7
Poorly Kept Housing		
No	622	87.1
Yes	92	12.9
Parks or Playgrounds		
No	116	16.2
Yes	598	83.8

Note. Frequencies not summing to $N = 714$ indicate missing data.

The descriptives for the continuous survey items are presented in Table 11. The number of preventative health care visits ranged from 0 to 20, with an average of 1.65 ($SD = 2.18$). Overall child health ranged from 1 to 5, with an average of 1.65 ($SD = .93$).

For child health, a lower score indicated better health, and a higher score indicated worse health. Poverty level ranged from 1 to 8, with an average of 5.47 (*SD* = 2.71). Lower poverty level scores indicated more poverty, and higher scores indicated less poverty. The variable of 'people in neighborhood help each other' ranged from 1 to 4, with an average of 1.77 (*SD* = .75). A higher score indicated a sense of less neighborhood support. The variable of 'child safety in the neighborhood' ranged from 1 to 4, with an average of 3.35 (*SD* = .79). A higher score indicated more child safety in the neighborhood. The variable of 'people in the neighborhood I can count' on ranged from 1 to 4, with an average of 1.49 (*SD* = .78). A higher score indicated a sense of less neighborhood community and support.

Table 11

Means and Standard Deviations of Continuous Survey Items

	N	Mean	*SD*	Min	Max
Number of Preventative Health Care Visits	714	1.65	2.18	0	20
Overall Child Health	714	1.65	.93	1	5
Poverty Level	714	5.47	2.71	1	8
People in Neighborhood Help Each Other	714	1.77	.75	1	4
Child Safe In Neighborhood	714	3.35	.79	1	4
People I Can Count on in Neighborhood	714	1.49	.78	1	4

Relationship between Demographic and Survey Items

Cross-tabulations with Pearson's chi-square were computed to examine the relationship between sex and the variables health insurance coverage needs met, consistency of coverage over the past year, type of coverage, place of health care, delayed or not received health care, asthma, cash assistance from state, food stamps, free or reduced school breakfast, neighborhood recreation center, neighborhood sidewalks, poorly kept housing, and neighborhood parks and playgrounds. As shown in Table 12, there was a significant relationship between child sex and whether or not the child had health insurance, $\chi^2(2) = 3.83$, $p = .050$, Cramer's $V = .073$. A greater proportion of females had health insurance (88.4%), compared to the proportion of males who had health insurance (83.2%). There was no significant relationship between gender and the remaining variables, all p's, *n*'s.

Cross-tabulations with Pearson's chi-square were computed to examine the relationship between ethnicity and the categorical survey items. As shown in Table 13, ethnicity was significantly related to child health insurance status, $\chi^2(2) = 26.82$, $p < .001$, Cramer's $V = .20$. A greater proportion of African Americans (21.3%) and Hispanics (20.4%) did not have insurance, compared to Caucasians (6.2%). In addition, a greater proportion of Caucasians did have health insurance (93.8%), compared to the proportions of Hispanics (79.6%) and African Americans (78.8%) who had health insurance.

Table 12

Frequencies and Percentages for Categorical Survey Items by Sex

	Male		Female			
	n	%	*n*	%	χ^2	*p*
Does the Child Have Health Insurance?					3.83	.050
No	63	16.8	39	11.6		
Yes	313	83.2	297	88.4		
Consistency of Insurance Coverage During Past 12 Months					.70	.402
Currently Uninsured/Periods No Coverage During Year	87	23.1	69	20.5		
Consistently Insured Throughout Past Year	289	76.9	267	79.5		
Type of Insurance Coverage					4.71	.095
Currently Uninsured	63	16.8	39	11.6		
Public Insurance (i.e. Medicaid or SCHIP)	76	20.2	82	24.4		
Private Health Insurance	237	63.0	215	64.0		
Place of Health Care					1.82	.610
Other/Not One Place Most Often	27	7.2	19	5.7		
Clinic or Health Center	71	18.9	56	16.7		
Hospital Emergency Room or Outpatient	16	4.3	12	3.6		
Doctor's Office	262	69.7	249	74.1		
Delayed/Not Received Health care					1.60	.205
No	27	7.2	33	9.8		
Yes	349	92.8	303	90.2		
Asthma					.05	.825
No	342	91.0	304	90.5		
Yes	34	9.0	32	9.5		

(continued)

	Male		Female			
	n	%	*n*	%	χ^2	*p*
Cash Assistance					.76	.385
No	367	97.6	331	98.5		
Yes	9	2.4	5	1.5		
Food Stamps					.32	.573
No	332	88.3	292	86.9		
Yes	44	11.7	44	13.1		
Reduced Cost/Free School Meals					.46	.500
No	253	67.3	234	69.6		
Yes	123	32.7	102	30.4		
Recreation Center					2.09	.148
No	153	40.7	119	35.4		
Yes	223	59.3	217	64.6		
Sidewalks					.50	.478
No	65	17.3	65	19.3		
Yes	311	82.7	271	80.7		
Poorly Kept Housing					.47	.492
No	331	88.0	290	86.3		
Yes	45	12.0	46	13.7		
Parks or Playgrounds					.47	.492
No	64	17.0	51	15.2		
Yes	312	83.0	285	84.8		

There was a significant relationship between ethnicity and consistency of insurance coverage, $\chi^2(2) = 30.88$, $p < .001$, Cramer's $V = .21$ (see Table 13). A smaller proportion of Caucasians were currently uninsured or had experienced periods of no

coverage during the year (11.3%), compared to the proportions of Hispanics (27.7%) and African Americans (33.8%) in the same category.

There was a significant relationship between ethnicity and type of insurance coverage, $\chi^2(2) = 139.91$, $p < .01$, Cramer's $V = .32$ (see Table 13). A greater proportion of Hispanics (20.4%) and African Americans (21.3%) were currently uninsured, compared to the proportion of Caucasians who were uninsured (6.2%). A greater proportion of Hispanics (34.9%) and African Americans (32.5) had public insurance plans, compared to the proportion of Caucasians (4.4%) who had public insurance plans. However, a greater proportion of Caucasians had private insurance (89.4%), compared to the proportions of Hispanics (44.7%) and African Americans (46.3) who had private insurance.

Additionally, there was a significant relationship between ethnicity and place of health care, $\chi^2(2) = 57.80$, $p < .001$, Cramer's $V = .20$ (see Table 13). A greater proportion of participants who were Hispanic used the clinics at health centers (25.2%), compared to the proportions of Caucasians (11.7%) and African Americans (10.0%) who did the same. In addition, a greater proportion of African Americans utilized hospital emergency rooms in outpatient settings (10.0%), compared to the proportions of Hispanics (4.7%) and Caucasians (1.1%) who did the same. A greater proportion of participants who were Caucasian used a doctor's office (85.0%), compared to the proportions of African Americans (67.5%) and Hispanics (61.6%) who did the same. Finally, a smaller proportion of Caucasians indicated they used another place of health

care or could not identify a most frequent location (2.2%), compared to the proportions of Hispanics (8.5%) and African Americans (12.5%) who did the same.

There was a significant relationship between ethnicity and delayed or not received health care, $\chi^2(2) = 8.20$, $p = .017$, Cramer's $V = .11$ (see Table 13). A greater proportion of African Americans did not delay health care (16.3%), compared to the proportions of Hispanics (8.2%) and Caucasians (6.2%) who did not delay health care. In addition, a smaller proportion of African Americans reported delayed or not received health care (83.8%), compared to the proportions of Hispanics (91.8%) and Caucasians (93.8%) who reported the same. The relationship between ethnicity and asthma was significant, $\chi^2(2) = 21.33$, $p < .001$, Cramer's $V = .17$. A greater proportion of African American participants had asthma (23.8%) than did Hispanics (7.5%) or Caucasians (7.7%).

Also shown in Table 13, the relationship between ethnicity and food stamps was significant, $\chi^2(2) = 49.22$, $p < .001$, Cramer's $V = .27$. A greater proportion of Caucasians were not on food stamps (98.2%), compared to the proportions of Hispanics (79.6%) and African Americans (81.3%) who were not on food stamps. The relationship between ethnicity and reduced cost or free school meals was significant, $\chi^2(2) = 155.80$, $p < .001$, Cramer's $V = .48$. A greater proportion of Hispanics (53.8%) and African Americans (37.5%) had reduced cost or free school meals, compared to the proportion of Caucasians (5.8%) who had the same.

Table 13

Frequencies and Percentages for Categorical Survey Items by Ethnicity

	Hispanic		Caucasian		African American			
	n	%	*n*	%	*n*	%	χ^2	*p*
Does the Child Have Health Insurance?							26.82	< .001
No	65	20.4	17	6.2	17	21.3		
Yes	253	79.6	257	93.8	63	78.8		
Consistency of Insurance Coverage During Past 12 Months							30.88	< .001
Currently Uninsured/Periods No Coverage During Year	88	27.7	31	11.3	27	33.8		
Consistently Insured Throughout Past Year	230	72.3	243	88.7	53	66.3		
Type of Insurance Coverage							139.91	< .001
Currently Uninsured	65	20.4	17	6.2	17	21.3		
Public Insurance (i.e. Medicaid or SCHIP)	111	34.9	12	4.4	26	32.5		
Private Health Insurance	142	44.7	245	89.4	37	46.3		
Place of Health Care							57.80	< .001
Other/Not One Place Most Often	27	8.5	6	2.2	10	12.5		
Clinic or Health Center	80	25.2	32	11.7	8	10.0		
Hospital Emergency Room or Outpatient	15	4.7	3	1.1	8	10.0		
Doctor's Office	196	61.6	233	85.0	54	67.5		
Delayed/Not Received Health Care							8.20	.017
No	26	8.2	17	6.2	13	16.3		
Yes	292	91.8	257	93.8	67	83.8		

(continued)

	Hispanic		Caucasian		African American			
	n	%	*n*	%	*n*	%	χ^2	*p*
Asthma							21.33	< .001
No	294	92.5	253	92.3	61	76.3		
Yes	24	7.5	21	7.7	19	23.8		
Cash Assistance							4.75	.093
No	308	96.9	272	99.3	79	98.8		
Yes	10	3.1	2	.7	1	1.3		
Food Stamps							49.22	< .001
No	253	79.6	269	98.2	65	81.3		
Yes	65	20.4	5	1.8	15	18.8		
Reduced Cost/Free School Meals							155.80	< .001
No	147	46.2	258	94.2	50	62.5		
Yes	171	53.8	16	5.8	30	37.5		
Recreation Center							15.72	< .001
No	136	42.8	108	39.4	15	18.8		
Yes	182	57.2	166	60.6	65	81.3		
Sidewalks							9.90	.007
No	68	21.4	56	20.4	5	6.3		
Yes	250	78.6	218	79.6	75	93.8		
Poorly Kept Housing							1.16	.559
No	277	87.1	242	88.3	67	83.8		
Yes	41	12.9	32	11.7	13	16.3		
Parks or Playgrounds							3.87	.145
No	52	16.4	49	17.9	7	8.8		
Yes	266	83.6	225	82.1	73	91.3		

The relationship between ethnicity and use of a recreation center was significant, $\chi^2(2) = 15.72$, $p < .001$, Cramer's $V = .15$ (see Table 13). A greater proportion of

African Americans did use a recreation center (81.3%), compared to the proportions of Caucasians (60.6%) and Hispanics (57.2%) who used a recreation center. The relationship between ethnicity and having sidewalks in the neighborhood was significant, $\chi^2(2) = 9.90$, $p = .007$, Cramer's $V = .12$. A greater proportion of African Americans reported having sidewalks in their neighborhoods (93.8%), compared to the proportions of Hispanics (78.6%) and Caucasians (79.65%) who reported the same. There was no significant relationship between ethnicity and the variables cash assistance, poorly kept housing, and parks or playgrounds.

Cross-tabulations with Pearson's chi-square were computed between mother's education and other categorical survey variables (see Table 14). There was a significant relationship between child health insurance and mother's education, $\chi^2(2) = 46.08$, $p < .001$, Cramer's $V = .26$. A greater proportion of participants with mothers who had less than a high school education did not have health insurance (34.9%), compared to the proportions of participants whose mothers had a high school education (18.1%) or more than a high school education (8.2%) and did not have health insurance.

There was a significant relationship between consistency of insurance coverage and mother's education, $\chi^2(2) = 54.95$, $p < .001$, Cramer's $V = .28$ (see Table 14). A greater proportion of participants whose mothers had less than a high school education were currently uninsured (46.5%), compared to the proportions of those with mothers who had a high school education (29.7%) and more than a high school education (13.4%). There was a significant relationship between type of insurance coverage and mother's education, $\chi^2(2) = 144.53$, $p < .001$, Cramer's $V = .33$. A greater proportion of

participants whose mothers had less than a high school education were currently uninsured (34.9%), compared to the proportions of those whose mothers had a high school education (18.1%) and more than a high school education (8.2%). In addition, a greater proportion of participants whose mothers had less than a high school education were on public insurance (43.0%), compared to the proportions of those whose mothers had a high school education (36.2%) and those whose mothers had more than a high school education (11.2%). Finally, a greater proportion of participants whose mothers completed more than a high school education had private health insurance (80.6%), compared to the proportions of those whose mothers had a high school education (45.7%) and those whose mothers had less than a high school education (22.1%).

Additionally, there was a significant relationship between place of health care and mother's education, $\chi^2(2) = 58.52$, $p < .001$, Cramer's $V = .21$ (see Table 14). A greater proportion of participants whose mothers had less than a high school education used clinics or health centers (37.2%), compared to the proportions of those whose mothers had a high school education (19.6%) and those whose mothers had more than a high school education (12.5%). In addition, a greater proportion of participants whose mothers completed more than a high school education utilized the doctor's office (81.3%), compared to the proportions of those whose mothers had a high school education (65.9%) or less than a high school education (45.3%).

There was a significant relationship between asthma and mother's education, $\chi^2(2) = 6.31$, $p < .043$, Cramer's $V = .10$. A greater proportion of participants whose mothers completed high school had asthma (14.5%), compared to the proportions of

those whose mothers completed more than a high school education (7.5%) or less than a high school education (8.1%).

There was a significant relationship between food stamps and mother's education, $\chi^2(2) = 49.47, p < .001$, Cramer's $V = .27$ (see Table 14). A greater proportion of participants whose mothers completed less than a high school education received food stamps (27.9%), compared to the proportions of those whose mothers had a high school education (22.5%) or more than a high school education (5.9%). There was also a significant relationship between reduced or free school meals and mother's education, $\chi^2(2) = 129.19, p < .001$, Cramer's $V = .44$. A greater proportion of participants whose mothers completed less than a high school education received reduced or free school meals (70.9%), compared to the proportions of those whose mothers had a high school education (49.3%) or more than a high school education (16.6%).

There was a significant relationship between sidewalks and mother's education, $\chi^2(2) = 19.41, p < .001$, Cramer's $V = .17$ (see Table 14). A greater proportion of participants whose mothers completed more than a high school education had sidewalks in their neighborhoods (85.9%), compared to the proportions of those whose mothers had a high school education (69.8%) or less than a high school education (73.2%). There was a significant relationship between poorly kept housing and mother's education, $\chi^2(2) = 17.24, p < .001$, Cramer's $V = .16$. A greater proportion of individuals whose mothers completed less than high school had poorly kept housing in their neighborhoods (23.3%), compared to the proportions of those whose mothers completed a high school education (18.1%) or more than a high school education (9.1%). There was not a relationship for

mother's education with parks, playgrounds, or recreation centers or delaying or not receiving health care or cash assistance.

Table 14

Frequencies and Percentages for Categorical Survey Items by Mother's Education

	Less than High School		High School		More than High School			
	n	%	*n*	%	*n*	%	χ^2	*P*
Does the Child Have Health Insurance?							46.08	< .001
No	30	34.9	25	18.1	36	8.2		
Yes	56	65.1	113	81.9	403	91.8		
Consistency of Insurance Coverage During Past 12 Months							54.95	< .001
Currently Uninsured/Periods No Coverage During Year	40	46.5	41	29.7	59	13.4		
Consistently Insured Throughout Past Year	46	53.5	97	70.3	380	86.6		
Type of Insurance Coverage							144.53	< .001
Currently Uninsured	30	34.9	25	18.1	36	8.2		
Public Insurance (i.e. Medicaid or SCHIP)	37	43.0	50	36.2	49	11.2		
Private Health Insurance	19	22.1	63	45.7	354	80.6		

(continued)

	Less than High School		High School		More than High School			
	n	%	*n*	%	*n*	%	χ^2	*p*
Place of Health Care							58.52	< .001
Other/Not One Place Most Often	11	12.8	16	11.6	15	3.4		
Clinic or Health Center	32	37.2	27	19.6	55	12.5		
Hospital Emergency Room or Outpatient	4	4.7	4	2.9	12	2.7		
Doctor's Office	39	45.3	91	65.9	357	81.3		
Delayed/Not Received Health Care							1.35	.510
No	9	10.5	13	9.4	32	7.3		
Yes	77	89.5	125	90.6	407	92.7		
Asthma							6.31	.043
No	79	91.9	118	85.5	406	92.5		
Yes	7	8.1	20	14.5	33	7.5		
Cash Assistance							3.24	.198
No	84	97.7	134	97.1	435	99.1		
Yes	2	2.3	4	2.9	4	0.9		
Food Stamps							49.47	< .001
No	62	72.1	107	77.5	413	94.1		
Yes	24	27.9	31	22.5	26	5.9		
Reduced Cost/Free School Meals							129.19	< .001
No	25	29.1	70	50.7	366	83.4		
Yes	61	70.9	68	49.3	73	16.6		

(continued)

	Less than High School		High School		More than High School			
	n	%	*n*	%	*n*	%	χ^2	*p*
Recreation Center							3.60	.165
No	39	45.3	58	42.0	158	36.0		
Yes	47	54.7	80	58.0	281	64.0		
Sidewalks							19.41	< .001
No	26	30.2	37	26.8	62	14.1		
Yes	60	69.8	101	73.2	377	85.9		
Poorly Kept Housing							17.24	< .001
No	66	76.7	113	81.9	399	90.9		
Yes	20	23.3	25	18.1	40	9.1		
Parks or Playgrounds							2.56	.279
No	14	16.3	28	20.3	64	14.6		
Yes	72	83.7	110	79.7	375	85.4		

Cross-tabulations with Pearson's chi-square were computed between father's education and other categorical survey variables (see Table 15). There was a significant relationship between child health insurance and father's education, χ^2 (2) = 47.70, p < .001, Cramer's V = .30. A greater proportion of participants whose fathers had a high school education or more than a high school education had health insurance (92.6%), compared to the proportions of those whose fathers had a high school diploma (75.9%) or less than a high school diploma (64.7%).

Table 15

Frequencies and Percentages for Categorical Survey Items by Father's Education

	Less than High School		High School		More than High School			
	n	%	*n*	%	*n*	%	χ^2	*p*
Does the Child Have Health Insurance?							47.70	< .001
No	24	35.3	20	24.1	28	7.4		
Yes	44	64.7	63	75.9	352	92.6		
Consistency of Insurance Coverage During Past 12 Months							48.91	< .001
Currently Uninsured/Periods No Coverage During Year	30	44.1	29	34.9	48	12.6		
Consistently Insured Throughout Past Year	38	55.9	54	65.1	332	87.4		
Type of Insurance Coverage							95.80	< .001
Currently Uninsured	24	35.3	20	24.1	28	7.4		
Public Insurance (i.e. Medicaid or SCHIP)	23	33.8	19	22.9	36	9.5		
Private Health Insurance	21	30.9	44	53.0	316	83.2		
Place of Health Care							65.47	< .001
Other/Not One Place Most Often	14	20.6	11	13.3	8	2.1		
Clinic or Health Center	19	27.9	18	21.7	49	12.9		
Hospital Emergency Room or Outpatient	4	5.9	5	6.0	11	2.9		
Doctor's Office	31	45.6	49	59.0	312	82.1		
Delayed/Not Received Health Care							1.16	.560
No	6	8.8	9	10.8	28	7.4		
Yes	62	91.2	74	89.2	352	92.6		

(continued)

	Less than High School		High School		More than High School			
	n	%	*n*	%	*n*	%	χ^2	*p*
Asthma							.41	.815
No	63	92.6	75	90.4	351	92.4		
Yes	5	7.4	8	9.6	29	7.6		
Cash Assistance							.36	.835
No	67	98.5	82	98.8	377	99.2		
Yes	1	1.5	1	1.2	3	0.8		
Food Stamps							43.41	< .001
No	53	77.9	72	86.7	371	97.6		
Yes	15	22.1	11	13.3	9	2.4		
Reduced Cost/Free School Meals							128.19	< .001
No	18	26.5	51	61.4	333	87.6		
Yes	50	73.5	32	38.6	47	12.4		
Recreation Center							6.99	.030
No	34	50.0	38	45.8	135	35.5		
Yes	34	50.0	45	54.2	245	64.5		
Sidewalks							11.42	.003
No	23	33.8	19	22.9	63	16.6		
Yes	45	66.2	64	77.1	317	83.4		
Poorly Kept Housing							3.10	.212
No	58	85.3	69	83.1	340	89.5		
Yes	10	14.7	14	16.9	40	10.5		
Parks or Playgrounds							1.92	.384
No	14	20.6	16	19.3	57	15.0		
Yes	54	79.4	67	80.7	323	85.0		

There was a significant relationship between consistency of insurance coverage and father's education, $\chi^2(2) = 48.91, p < .001$, Cramer's $V = .30$ (see Table 15). A greater proportion of participants whose fathers had less than a high school education were currently uninsured (44.1%), compared to the proportions of those whose fathers had a high school education (34.9%) or more than high school education (12.6%) and were currently uninsured. There was a significant relationship between type of insurance coverage and father's education, $\chi^2(2) = 95.80, p < .001$, Cramer's $V = .30$. A greater proportion of participants whose fathers had less than a high school education were currently uninsured (35.3%), compared to the proportions of those whose fathers had a high school education (24.1%) or more than a high school education (7.4%) and were currently uninsured. In addition, a greater proportion of participants whose fathers had less than a high school education were on public insurance (33.8%), compared to the proportions of those whose fathers had a high school education (22.9%) or more than high school education (9.5%) and were on public insurance. Finally, a greater proportion of participants whose fathers completed more than high school education had private health insurance (83.2%), compared to the proportions of those whose fathers had a high school education (53.0%) or more than high school (30.9%) and had private health insurance.

As also seen in Table 15, there was a significant relationship between place of health care and father's education, $\chi^2(2) = 65.47, p < .001$, Cramer's $V = .20$. A greater proportion of participants whose fathers had less than a high school education said that they did not visit one place the most often (20.6%), compared to the proportions of those

whose fathers had a high school education (13.3%) or more than a high school education (2.1%). Also, a greater proportion of participants whose fathers had less than a high school education used clinics or health centers (27.9%), compared to the proportions of those whose fathers had a high school education (21.7%) or more than a high school education (12.9%) and used clinics or health centers. In addition, a greater proportion of participants whose fathers completed more than a high school education utilized the doctor's office (82.1%), compared to the proportions of those whose fathers had a high school education (59.0%) or less than a high school education (45.6%).

Additionally, there was a significant relationship between receiving food stamps and father's education, $\chi^2(2) = 43.41$, $p < .001$, Cramer's $V = .19$. A greater proportion of participants whose fathers had less than a high school education received food stamps (22.1%), compared to the proportions of those whose fathers had a high school education (13.3%) or more than a high school education (2.4%). There was a significant relationship between reduced cost or free school meals and father's education, $\chi^2(2) = 128.19$, $p < .001$, Cramer's $V = .28$. A greater proportion of participants whose fathers had less than a high school education received free or reduced lunches (73.5%), compared to the proportions of those whose fathers had a high school education (38.6%) or more than a high school education (12.4%).

There was a significant, but non-meaningful, relationship between father's education and a recreation center in the neighborhood, $\chi^2(2) = 6.99$, $p < .030$, Cramer's $V = .03$. A greater proportion of participants whose fathers had more than a high school education had a recreation center in their neighborhoods (64.5%), compared to the

proportions of those whose fathers had a high school education (54.2%) or less than a high school education (50.0%). There was a significant relationship between sidewalks and father's education, $\chi^2(2) = 11.42$, $p < .003$, Cramer's $V = .05$. A greater proportion of participants whose fathers completed more than a high school education had sidewalks in their neighborhoods (83.4%), compared to the proportions of those whose fathers had a high school education (77.1%) or less than a high school education (66.2%). Finally, there was no significant relationship between father's education and delaying or not receiving health care, whether or not the child had asthma, cash assistance received, poorly kept housing, or the presence of parks and playgrounds in the neighborhood (all p's $> .05$).

Cross-tabulations with Pearson's chi-square were computed between household work status and other categorical survey variables (see Table 16). There was a significant relationship between health insurance and household work status, $\chi^2(2) = 5.42$, $p < .020$, Cramer's $V = .87$. A greater proportion of participants who had at least one parent who was employed full time had health insurance (86.6%), compared to the proportion of those who did not have at least one parent who was employed full time (75.8%). There was a significant relationship between consistency of insurance coverage and household work status, $\chi^2(2) = 11.50$, $p < .001$, Cramer's $V = .08$. A greater proportion of participants without at least one parent who was employed full time were currently uninsured or were uninsured at some point during the year (38.7%), compared to the proportion of those with at least one parent who was employed full time (20.1%).

Table 16

Frequencies and Percentages for Categorical Survey Items by Household Work Status.

	No		Yes			
	n	%	*n*	%	χ^2	*P*
Does the Child Have Health Insurance?					5.42	.020
No	15	24.2	87	13.4		
Yes	47	75.8	564	86.6		
Consistency of Insurance Coverage During Past 12 Months					11.50	.001
Currently Uninsured/Periods No Coverage During Year	24	38.7	131	20.1		
Consistently Insured Throughout Past Year	38	61.3	520	79.9		
Type of Insurance Coverage					48.27	< .001
Currently Uninsured	15	24.2	87	13.4		
Public Insurance (i.e. Medicaid or SCHIP)	32	51.6	125	19.2		
Private Health Insurance	15	24.2	439	67.4		
Place of Health Care					14.29	.003
Other/Not One Place Most Often	7	11.3	39	6.0		
Clinic or Health Center	18	29.0	108	16.6		
Hospital Emergency Room or Outpatient	5	8.1	23	3.5		
Doctor's Office	32	51.6	481	73.9		
Delayed/Not Received Health Care					.01	.917
No	5	8.1	55	8.4		
Yes	57	91.9	596	91.6		
Asthma					1.08	.300
No	54	87.1	593	91.1		
Yes	8	12.9	58	8.9		

(continued)

	No		Yes			
	n	%	*n*	%	χ^2	*P*
Delayed/Not Received Health Care					.01	.917
No	5	8.1	55	8.4		
Yes	57	91.9	596	91.6		
Asthma					1.08	.300
No	54	87.1	593	91.1		
Yes	8	12.9	58	8.9		
Cash Assistance					13.13	< .001
No	57	91.9	642	98.6		
Yes	5	8.1	9	1.4		
Food Stamps					21.03	< .001
No	43	69.4	582	89.4		
Yes	19	30.6	69	10.6		
Reduced Cost/Free School Meals					34.53	< .001
No	22	35.5	467	71.7		
Yes	40	64.5	184	28.3		
Recreation Center					.14	.712
No	25	40.3	247	37.9		
Yes	37	59.7	404	62.1		
Sidewalks					2.61	.106
No	16	25.8	114	17.5		
Yes	46	74.2	537	82.5		
Poorly Kept Housing					.69	.406
No	52	83.9	570	87.6		
Yes	10	16.1	81	12.4		
Parks or Playgrounds					.57	.452
No	8	12.9	108	16.6		
Yes	54	87.1	543	83.4		

There was a significant relationship between type of insurance coverage and household work status, $\chi^2(2) = 48.27, p < .001$, Cramer's $V = .26$ (see Table 16). A greater proportion of participants without at least one parent who was employed full time were currently uninsured (24.2%), compared to the proportion of those with at least one parent who was employed full time employed (13.4%). In addition, a greater proportion of participants without at least one parent who was employed full time had public insurance (51.6%), compared to the proportion of those with at least one parent who was employed full time (19.2%). Finally, a greater proportion of participants with at least one parent who was employed full time had private health insurance (67.4%), compared to the proportion of those without at least one parent who was employed full time (24.4%).

Also, there was a significant relationship between place of health care and household work status, $\chi^2(2) = 14.29, p < .003$, Cramer's $V = .14$ (see Table 16). A greater proportion of participants without at least one parent who was employed full time did not use one health care setting more than other health care settings (11.3%), compared to the proportion of those with at least one parent who was employed full time (6.0%). In addition, a greater proportion of participants without at least one parent who was employed full time used a clinic or health center (29.0%), compared to the proportion of those with at least one parent who was employed full time (16.6%). Finally, a greater proportion of participants with at least one parent who was employed full time used a doctor's office (73.9%), compared to the proportion of those without at least one full time employed parent (51.6%).

Additionally, there was a significant relationship between cash assistance and household work status, $\chi^2(2) = 13.13$, $p < .001$, Cramer's $V = .13$ (see Table 16). A greater proportion of participants with at least one parent who was employed full time did not receive cash assistance (98.6%), compared to the proportion of those without at least one parent who was employed full time (91.9%). There was a significant relationship between food stamps and household work status, $\chi^2(2) = 21.03$, $p < .001$, Cramer's $V = .17$. A greater proportion of participants without at least one parent who was employed full time received food stamps (30.6 %), compared to the proportion of those with at least one parent who was employed full time (10.6%). There was a significant relationship between free or reduced cost school meals and household work status, $\chi^2(2) = 34.53$, $p < .001$, Cramer's $V = .22$. A greater proportion of participants without at least one parent who was employed full time received free or reduced cost school meals (64.5%), compared to the proportion of those with at least one parent who was employed full time (28.3%). There was no relationship, however, between household work status and either delaying health care, having asthma, or having recreation centers, sidewalks, poorly kept houses, parks, or playgrounds in the neighborhood (all p's $>.05$).

Cross-tabulations with Pearson's chi-square were computed between BMI classification and other categorical survey variables (see Table 17). There was a significant relationship between health insurance and BMI classification, $\chi^2(2) = 6.00$, $p = .014$, Cramer's $V = .09$. A greater proportion of participants who were not overweight or obese had health insurance (87.9%), compared to the proportion of participants who were overweight and obese and had health insurance (80.9%). There was a significant

relationship between consistency of insurance and BMI classification, $\chi^2(2) = 4.60$, $p = .032$, Cramer's $V = .08$. A greater proportion of participants who were overweight or obese were either currently uninsured or had had periods in the past year during which they were uninsured (26.8%), compared to the proportion of participants who were not overweight or obese (19.6%).

There was a significant relationship between type of insurance coverage and BMI classification, $\chi^2(2) = 23.72$, $p < .001$, Cramer's $V = .18$ (see Table 17). A greater proportion of participants who were overweight or obese were currently uninsured (19.1%), compared to the proportion of participants who were not overweight or obese and were currently uninsured (12.1%). In addition, a greater proportion of participants who were overweight or obese used public insurance (30.5%), compared to the proportion of participants who were not overweight or obese and used public insurance (18.4%). Finally, a greater proportion of participants who were not overweight or obese used private insurance (69.4%), compared to participants who were overweight or obese and used private insurance (50.5%).

Table 17

Frequencies and Percentages for Categorical Survey Items by BMI Classification.

	Not Overweight/Obese		Overweight/ Obese			
	n	%	*n*	%	χ^2	*p*
Does the Child Have Health Insurance?					6.00	.014
No	60	12.1	42	19.1		
Yes	434	87.9	178	80.9		
Consistency of Insurance Coverage During Past 12 Months					4.60	.032
Currently Uninsured/Periods No Coverage During Year	97	19.6	59	26.8		
Consistently Insured Throughout Past Year	397	80.4	161	73.2		
Type of Insurance Coverage					23.72	< .001
Currently Uninsured	60	12.1	42	19.1		
Public Insurance (i.e. Medicaid or SCHIP)	91	18.4	67	30.5		
Private Health Insurance	343	69.4	111	50.5		
Place of Health Care					31.22	< .001
Other/Not One Place Most Often	19	3.8	27	12.3		
Clinic or Health Center	79	16.0	48	21.8		
Hospital Emergency Room or Outpatient	14	2.8	14	6.4		
Doctor's Office	382	77.3	131	59.5		

(continued)

	Not Overweight/Obese		Overweight/ Obese			
	n	%	*n*	%	χ^2	*p*
Delayed/Not Received Health Care					.02	.881
No	41	8.3	19	8.6		
Yes	453	91.7	201	91.4		
Asthma					1.05	.305
No	452	91.5	196	89.1		
Yes	42	8.5	24	10.9		
Cash Assistance					4.64	.031
No	488	98.8	212	96.4		
Yes	6	1.2	8	3.6		
Food Stamps					26.52	< .001
No	454	91.9	172	78.2		
Yes	40	8.1	48	21.8		
Reduced Cost/Free School Meals					58.06	< .001
No	382	77.3	107	48.6		
Yes	112	22.7	113	51.4		
Recreation Center					.96	.327
No	183	37.0	90	40.9		
Yes	311	63.0	130	59.1		
Sidewalks					1.93	.165
No	84	17.0	47	21.4		
Yes	410	83.0	173	78.6		

(continued)

	Not Overweight/Obese		Overweight/ Obese			
	n	%	*n*	%	χ^2	*p*
Poorly Kept Housing					.78	.377
No	434	87.9	188	85.5		
Yes	60	12.1	32	14.5		
Parks or Playgrounds					.03	.870
No	81	16.4	35	15.9		
Yes	413	83.6	185	84.1		

There was a significant relationship between place of health care and BMI classification, $\chi^2(2) = 31.22$, $p < .001$, Cramer's $V = .20$ (see Table 17). A higher proportion of participants who were overweight or obese did not use any one health care setting over another (12.3%), compared to the proportion of participants who were not overweight or obese and did not use any one health care setting over another (3.8%). In addition, a higher proportion of participants who were overweight or obese used a clinic or health care center (21.8%), compared to the proportion of participants who were not overweight or obese and used a clinic or health care center (16.0%). Finally, a higher proportion of participants who were not overweight or obese used a doctor's office (77.3%), compared to the proportion of those who were overweight or obese and used a doctor's office (59.5%).

Additionally, there was a significant relationship between food stamps and BMI classification, X^2 (2) = 26.52, p < .001, Cramer's V = .19 (see Table 17). A greater proportion of participants who were overweight or obese received food stamps (21.8%), compared to the proportions of those who were not overweight or obese and received food stamps (8.1%). There was a significant relationship between free or reduced cost school meals and BMI classification, χ^2 (2) = 58.06, p < .001, Cramer's V =.28. A greater proportion of participants who were overweight or obese received free or reduced cost school lunches (51.4%), compared to the proportion of participants who were not overweight or obese and received free or reduced cost school lunches (22.7%). There was a significant relationship between receiving cash assistance and BMI classification, χ^2 (2) = 4.64, p < .031, Cramer's V = .08. Due to the small effect size, however, this was not a meaningful relationship. There was no significant relationship between BMI classification and either delaying health care, having asthma, or having the presence of recreation centers, sidewalks, poorly kept houses, parks, or playgrounds in the neighborhood (all p's > .05).

Several one-way ANOVAs were conducted to determine if child's sex affects the continuous dependent variables (see Table 18). There was a significant effect of child's sex on parent ratings of neighborhood safety, F (1, 710) = 4.59, p = .033. Parents felt like boys (M = 3.41, SD = .80) were significantly safer in the neighborhood than were girls (M = 3.29, SD = .78).

Table 18

Means and Standard Deviations for Number of Preventative Health Care Visits, Overall Child Health, Poverty Level, People in Neighborhood Help Each Other, Child Safe in Neighborhood, People in Neighborhood I Can Count on by Sex.

	n	Mean	*SD*	*F*	*p*
Number of Preventative Health Care Visits				.03	.876
Male	376	1.66	2.26		
Female	336	1.63	2.09		
Overall Child Health				.54	.464
Male	376	1.63	.89		
Female	336	1.68	.96		
Poverty Level				.07	.797
Male	376	5.44	2.76		
Female	336	5.49	2.66		
People in Neighborhood Help Each Other				.69	.408
Male	376	1.74	.77		
Female	336	1.79	.74		
Child Safe In Neighborhood				4.59	.033
Male	376	3.41	.80		
Female	336	3.29	.78		
People in Neighborhood I Can Count on				.20	.657
Male	376	1.51	.80		
Female	336	1.48	.77		

Several one-way ANOVAs were conducted to determine whether ethnicity affected the continuous dependent variables. As shown in Table 19, there was a significant difference in the number of preventative health care visits by ethnicity, F (2, 669) = 4.89, p = .008. Hispanics had approximately an equivalent number of preventative health care visits (M = 1.81, SD = 2.51) to that of African Americans (M = 1.86, SD = 1.87). Both groups had a greater number of preventative health care visits than did Caucasians (M = 1.33, SD = 1.24). There were also significant differences in overall child health by ethnicity, F (2, 669) = 42.78, $p < .001$. Hispanics (M = 1.91, SD = 1.04) and African Americans (M = 1.98, SD = .98) reported poorer overall child health than did Caucasians (M = 1.29, SD = .60).

Table 19

Means and Standard Deviations for Number of Preventative Health Care Visits, Overall Child Health, Poverty Level, People in Neighborhood Help Each Other, Child Safe in Neighborhood, People in Neighborhood I Can Count on by Ethnicity

	n	Mean	*SD*	*F*	*p*
Number of Preventative Health Care Visits				4.89	.008
Hispanic	318	1.81[a]	2.51		
Caucasian	274	1.33[b]	1.24		
African American	80	1.86[ab]	1.87		
Overall Child Health				42.78	< .001
Hispanic	318	1.91[a]	1.04		
Caucasian	274	1.29[b]	.60		
African American	80	1.98[ac]	.98		

(continued)

	n	Mean	*SD*	*F*	*p*
Poverty Level				121.94	< .001
Hispanic	318	4.16[a]	2.74		
Caucasian	274	7.12[b]	1.61		
African American	80	4.76[ac]	2.69		
People in Neighborhood Help Each Other				8.96	< .001
Hispanic	318	1.83[a]	.80		
Caucasian	274	1.62[b]	.66		
African American	80	1.96[ac]	.80		
Child Safe In Neighborhood				8.28	< .001
Hispanic	318	3.30[a]	.85		
Caucasian	274	3.49[b]	.62		
African American	80	3.12[ac]	.95		
People in Neighborhood I Can Count				13.90	< .001
Hispanic	318	1.56[a]	.79		
Caucasian	274	1.31[b]	.66		
African American	80	1.76[ac]	.96		

Note. Means with different superscripts differ, $p < .05$.

Significant differences in poverty level by ethnicity were found, F (2, 669) = 121.94, $p < .001$ (see Table 19). Hispanics ($M = 4.16$, $SD = 2.74$) and African Americans ($M = 4.76$, $SD = 2.69$) had higher poverty levels than did Caucasians ($M = 7.12$, $SD = 1.61$). The extent to which neighborhood people were said to help each other differed significantly by ethnicity, F (2, 669) = 8.96, $p < .001$. Hispanics ($M = 1.83$, $SD = .80$) and African Americans ($M = 1.96$, $SD = .80$) reported more people in the neighborhood helping each other than did Caucasians ($M = 1.62$, $SD = .66$). There were differences by ethnicity in how safe children were said to be in the neighborhood, F (2, 669) = 8.28, $p < .001$. Caucasians reported that they felt their children were safer in their neighborhood ($M = 3.49$, $SD = .62$) than did Hispanics ($M = 3.30$, $SD = .85$) or African Americans ($M = 3.12$, $SD = .95$). There were significant differences in whether participants said there were neighborhood people they could count on by ethnicity, F (2, 669) = 13.90, $p < .001$. Hispanics ($M = 1.56$, $SD = .79$) and African Americans ($M = 1.76$, $SD = .96$) believed that they could count on people in their neighborhood to a greater extent than did Caucasians ($M = 1.31$, $SD = .66$).

Several one-way ANOVAs were conducted to determine whether mother's education affected the continuous dependent variables. As shown in Table 20, there were significant differences in overall child health by mother's education, F (2, 660) = 29.89, $p < .001$. Participants whose mothers had more than a high school education reported better overall child health ($M = 1.45$, $SD = .73$) than did those with a high school education ($M = 1.93$, $SD = 1.09$) or less than a high school education ($M = 2.09$, $SD = 1.12$). The results revealed a significant effect of mother's education on poverty level, F

(2, 660) = 124.04, $p < .001$. Participants whose mothers had more than a high school education reported the least amount of poverty ($M = 6.54$, $SD = 2.15$). Those with a high school education had significantly more poverty ($M = 4.04$, $SD = 2.65$), and those with less than a high school education reported the most poverty ($M = 3.03$, $SD = 2.28$). There were significant differences by mother's education in the perceptions of being able to rely on neighborhood people, F (2, 660) = 5.14, $p < .006$. Participants whose mothers had a high school education had higher ratings of the variable of people in neighborhood help each other ($M = 1.93$, $SD = .82$) than did those with mothers who completed more than a high school education ($M = 1.71$, $SD = .69$).

Table 20

Means and Standard Deviations for Number of Preventative Health Care Visits, Overall Child Health, Poverty Level, People in Neighborhood Help Each Other, Child Safe in Neighborhood, and People in Neighborhood I Can Count on by Mother's Education

	n	Mean	*SD*	*F*	*p*
Number of Preventative Health Care Visits				2.25	.106
Less than High School	86	1.91	3.22		
High School	138	1.82	2.57		
More than High School	439	1.49	1.56		
Overall Child Health				29.89	< .001
Less than High School	86	2.09	1.12		
High School	138	1.93	1.09		
More than High School	439	1.45	.73		

(continued)

	n	Mean	*SD*	*F*	*p*
Poverty Level				124.04	< .001
Less than High School	86	3.03	2.28		
High School	138	4.04	2.65		
More than High School	439	6.54	2.15		
People in Neighborhood Help Each Other				5.14	.006
Less than High School	86	1.73[ab]	.82		
High School	138	1.93[a]	.82		
More than High School	439	1.71[b]	.69		
Child Safe In Neighborhood				3.53	.030
Less than High School	86	3.37[ab]	.86		
High School	138	3.20[ab]	.92		
More than High School	439	3.40[ab]	.71		
People in Neighborhood I Can Count on				10.17	< .001
Less than High School	86	1.50[ab]	.68		
High School	138	1.73[a]	1.00		
More than High School	439	1.40[b]	.67		

There were also significant differences by mother's education between perceptions of child safety in the neighborhood, F (2, 660) = 3.53, p = .030 (see Table 20). However, posthoc tests did not reveal significant differences between any of the pairs of mother education levels. The trend was that participants whose mother had a high school education had the lowest scores for child safety in neighborhood. Finally,

there were differences by mother's education in perceptions of the reliability of neighborhood people, F (2, 660) = 10.17, $p < .001$. Participants whose mothers had a high school education had significantly higher scores for the people in neighborhood I can count on ($M = 1.73$, $SD = 1.00$) than did those whose mothers had more than a high school education ($M = 1.40$, $SD = .67$). There were no significant differences in number of preventative health care visits by mother's education ($p < .05$).

Several one-way ANOVAs were conducted to determine whether father's education affected the continuous dependent variables. As shown in Table 21, there were significant differences between levels of father's education and (a) overall child health, F (2, 528) = 35.01, $p < .001$; (b) poverty level, F (2, 528) = 117.23, $p < .001$; (c) people in neighborhood help each other, F (2, 528) = 6.43, $p = .002$; and (d) people in neighborhood I can count on, F (2, 528) = 7.38, $p < .001$. Participants whose fathers had more than high school education reported the best child health ($M = 1.39$, $SD = .76$) than did those with a high school education ($M = 1.89$, $SD = .98$) or less than a high school education ($M = 2.22$, $SD = 1.06$). In addition, participants whose fathers have more than a high school education had significantly less poverty ($M = 6.86$, $SD = 1.86$) than did those with a high school education ($M = 4.70$, $SD = 2.51$). Participants whose fathers had no high school education had the significantly highest level of poverty ($M = 3.15$, $SD = 2.34$). Participants whose fathers had a high school education scored higher on the variable for people in neighborhood help each other ($M = 1.98$, $SD = .75$) than did those whose fathers had more than a high school education ($M = 1.68$, $SD = .69$) or less than a high school education ($M = 1.68$, $SD = .70$). Participants whose fathers had a high school

education scored higher on the variable for people in neighborhood I can count on (M = 1.61, SD = .85) than did those whose fathers had more than a high school education (M = 1.35, SD = .63). There were no significant differences in number of preventative health care visits or child safe in neighborhood by father's education.

Table 21

Means and Standard Deviations for Number of Preventative Health Care Visits, Overall Child Health, Poverty Level, People in Neighborhood Help Each Other, Child Safe in Neighborhood, and People in Neighborhood I Can Count on by Father's Education

	n	Mean	*SD*	*F*	*P*
Number of Preventative Health Care Visits				.86	.424
Less than High School	68	1.53	1.62		
High School	83	1.33	1.05		
More than High School	380	1.64	2.26		
Overall Child Health				35.01	< .001
Less than High School	68	2.22[a]	1.06		
High School	83	1.89[a]	.98		
More than High School	380	1.39[b]	.76		
Poverty Level				117.23	< .001
Less than High School	68	3.15[a]	2.34		
High School	83	4.70[b]	2.51		
More than High School	380	6.86[c]	1.86		
People in Neighborhood Help Each Other				6.43	.002
Less than High School	68	1.68[a]	.70		
High School	83	1.98[b]	.75		
More than High School	380	1.68[a]	.69		

(continued)

	n	Mean	*SD*	*F*	*P*
Child Safe In Neighborhood				.05	.955
Less than High School	68	3.37	.86		
High School	83	3.40	.80		
More than High School	380	3.40	.73		
People in Neighborhood I Can Count on				7.38	.001
Less than High School	68	1.60[ab]	.83		
High School	83	1.61[a]	.85		
More than High School	380	1.35[b]	.63		

Several one-way ANOVAs were conducted to determine whether household work status affected the continuous dependent variables. As shown in Table 22, there were significant differences between household work status and (a) number of preventative health care visits, $F(1, 711) = 4.01$, $p = .046$; (b) overall child health, $F(1, 711) = 35.33$, $p < .001$; (c) poverty level, $F(1, 711) = 98.16$, $p < .001$; (d) people in neighborhood help each other, $F(1, 711) = 5.57$, $p = .019$; and (e) people in neighborhood I can count on, $F(1, 711) = 14.74$, $p < .001$. Participants with at least one parent who was employed full time had significantly fewer preventative health care visits ($M = 1.60$, $SD = 1.95$) than did those without at least one parent who was employed full time ($M = 2.18$, $SD = 3.83$). Participants with at least one parent who was employed full time had better overall child health ($M = 1.59$, $SD = .88$) than did those without at least one parent who was employed full time ($M = 2.31$, $SD = 1.14$). Participants with at least one parent who was employed

full time scored lower on poverty ($M = 2.42$, $SD = 2.27$) than did those without at least one parent who was employed full time ($M = 5.77$, $SD = 2.57$). In addition, participants without at least one parent who was employed full time had higher scores on the variables of people in neighborhood help each other ($M = 1.98$, $SD = .95$) and people in neighborhood I can count on ($M = 1.85$, $SD = 1.05$) than did those with at least one parent who was employed full time on the same variables ($M = 1.75$, $SD = .73$ and $M = 1.46$, $SD = .74$, respectively). There were no differences in child safe in neighborhood by household work status ($p < .05$).

Several one-way ANOVAs were conducted to determine whether BMI classification affected the continuous dependent variables. As shown in Table 23, there were differences between BMI classification for overall child health, $F(1, 712) = 40.04$, $p < .001$, and poverty level, $F(1, 712) = 54.95$, $p < .001$, and for people in neighborhood I can count on, $F(1, 712) = 5.49$, $p < .019$. Participants who were not overweight or obese had better overall health ($M = 1.51$, $SD = .85$) than did those who were overweight or obese ($M = 1.97$, $SD = 1.01$). Participants who were not overweight or obese had less poverty ($M = 5.95$, $SD = 2.52$) than did those who were overweight or obese ($M = 4.38$, $SD = 2.82$). Finally, parents/guardians of participants who had children who were overweight or obese reported higher scores for the variable of people in neighborhood I can count on in ($M = 1.60$, $SD = .87$) than did those who were not overweight or obese ($M = 1.45$, $SD = .74$). There were no differences between the variables preventative health care visits, people in neighborhood help each other, and child safe in neighborhood by BMI classification ($p < .05$).

Table 22

Means and Standard Deviations for Number of Preventative Health Care Visits, Overall Child Health, Poverty Level, People in Neighborhood Help Each Other, Child Safe in Neighborhood, and People in Neighborhood I Can Count on by Household Work Status

	n	Mean	*SD*	*F*	*p*
Number of Preventative Health Care Visits				4.01	.046
No	62	2.18	3.83		
Yes	651	1.60	1.95		
Overall Child Health				35.33	< .001
No	62	2.31	1.14		
Yes	651	1.59	.88		
Poverty Level				98.16	< .001
No	62	2.42	2.27		
Yes	651	5.77	2.57		
People in Neighborhood Help Each Other				5.57	.019
No	62	1.98	.95		
Yes	651	1.75	.73		
Child Safe In Neighborhood				.99	.319
No	62	3.26	.92		
Yes	651	3.36	.78		
People in Neighborhood I Can Count on				14.74	< .001
No	62	1.85	1.05		
Yes	651	1.46	.74		

Table 23

Means and Standard Deviations for Number of Preventative Health Care Visits, Overall Child Health, Poverty Level, People in Neighborhood Help Each Other, Child Safe in Neighborhood, and People in Neighborhood I Can Count on by BMI Classification

	n	Mean	*SD*	*F*	*p*
Number of Preventative Health Care Visits				3.43	.064
Not Overweight/Obese	494	1.55	1.82		
Overweight/Obese	220	1.87	2.81		
Overall Child Health				40.04	< .001
Not Overweight/Obese	494	1.51	.85		
Overweight/Obese	220	1.97	1.01		
Poverty Level				54.95	< .001
Not Overweight/Obese	494	5.95	2.52		
Overweight/Obese	220	4.38	2.82		
People Neighborhood Help Each Other				2.66	.103
Not Overweight/Obese	494	1.74	.73		
Overweight/Obese	220	1.84	.80		
Child Safe In Neighborhood				1.27	.260
Not Overweight/Obese	494	3.38	.77		
Overweight/Obese	220	3.30	.84		
People in Neighborhood I Can Count on				5.49	.019
Not Overweight/Obese	494	1.45	.74		
Overweight/Obese	220	1.60	.87		

A series of one-way ANOVAs were conducted to test differences in age between the categorical survey items. As shown in Table 24, there was a difference in age by

insurance type, F (2, 713) = 4.90, p = .008. Participants with public insurance were younger (M = 13.32, SD = 2.20) than were those who were currently uninsured (M = 14.07, SD = 2.31) or who had private health insurance (M = 13.91, SD = 2.22). There was a difference in age by reduced school lunch, F (1, 712) = 5.08, p = .025. Participants who received reduced lunches were younger (M = 13.52, SD = 2.25) than those who did not (M = 13.93, SD = 2.23). There was no difference in age by place of health care, delayed health care, asthma, cash assistance, food stamps, recreation center, sidewalks, poorly kept housing, or parks or playground (all p's < .05).

Table 24

Means and Standard Deviations for Age by Categorical Survey Items

	n	Mean	*SD*	*F*	*p*
Does the Child Have Health Insurance?				1.68	.196
No	102	14.07	2.31		
Yes	612	13.76	2.23		
Type of Insurance Coverage				4.90	.008
Currently Uninsured	102	14.07[a]	2.31		
Public Insurance (i.e. Medicaid or SCHIP)	158	13.32[b]	2.20		
Private Health Insurance	454	13.91[a]	2.22		
Place of Health Care				.35	.791
Other/Not One Place Most Often	46	13.57	2.20		
Clinic or Health Center	127	13.94	2.23		
Hospital Emergency Room or Outpatient	28	13.89	2.44		
Doctor's Office	513	13.79	2.24		

(continued)

	n	Mean	*SD*	*F*	*p*
Delayed/Not Received Health Care				.45	.503
No	60	13.62	2.39		
Yes	654	13.82	2.23		
Asthma				.00	.956
No	648	13.80	2.26		
Yes	66	13.79	2.05		
Cash Assistance				.01	.927
No	700	13.80	2.24		
Yes	14	13.86	2.45		
Food Stamps				1.44	.231
No	626	13.84	2.24		
Yes	88	13.53	2.26		
Reduced Cost/Free School Meals				5.08	.025
No	489	13.93	2.23		
Yes	225	13.52	2.25		
Recreation Center					
No	273	13.83	2.33	.786	.79
Yes	441	13.78	2.19		
Sidewalks				2.43	.119
No	131	13.53	2.34		
Yes	583	13.86	2.22		
Poorly Kept Housing				.00	.993
No	622	13.80	2.26		
Yes	92	13.80	2.13		
Parks or Playgrounds				.59	.445
No	116	13.95	2.25		
Yes	598	13.77	2.24		

A series of one-way ANOVAs were conducted to test differences in BMI between the categorical survey items (see Table 25). There was a difference in BMI by health insurance, F (1, 712) = 6.79, p = .009. Participants without health insurance had higher BMI scores (M = 23.12, SD = 6.13) than those with health insurance (M = 21.63, SD = 5.21). There was a difference in BMI by type of insurance, F (2, 711) = 10.82, p < .001. Participants with private insurance had lower BMI scores (M = 21.15, SD = 4.65) than those with other types of insurance (M = 23.12, SD = 6.13). There was a difference in BMI by place of health care, F (1, 711) = 9.77, p < .001. Participants who visited a doctor's office had lower BMI scores (M = 21.21, SD = 4.79) than those who visited other health care settings (M = 22.97–24.46, SD = 4.78–6.66). There was a difference in BMI by food stamps, F (1, 712) = 25.24, p < .001. Participants who used food stamps had a higher BMI (M = 24.49, SD = 6.87) than those who did not use food stamps (M = 21.47, SD = 5.02). There was a difference in BMI by reduced school lunch, F (1, 712) = 38.99, p < .001. Participants who receive reduced or free school meals had higher BMI scores (M = 23.65, SD = 6.45) than those who did not receive reduced or free school meals (M = 21.02, SD = 4.56). There was no difference in BMI by parks or playgrounds, delayed health care, asthma, cash assistance, recreation center, sidewalks, or poorly kept housing (all p's < .05).

Table 25

Means and Standard Deviations for BMI by Categorical Survey Items

	n	Mean	*SD*	*F*	*p*
Does the Child Have Health Insurance?				6.79	.009
No	102	23.12	6.13		
Yes	612	21.63	5.21		
Type of Insurance Coverage				10.82	< .001
Currently Uninsured	102	23.12[a]	6.13		
Public Insurance (i.e. Medicaid or SCHIP)	158	23.03[a]	6.35		
Private Health Insurance	454	21.15[b]	4.65		
Place of Health Care				9.77	< .001
Other/Not One Place Most Often	46	24.46[a]	6.66		
Clinic or Health Center	127	22.97[a]	6.54		
Hospital Emergency Room or Outpatient	28	24.02[a]	4.78		
Doctor's Office	513	21.21[b]	4.79		
Delayed/Not Received Health Care				.04	.849
No	60	21.72	5.82		
Yes	654	21.86	5.33		
Asthma				2.33	.127
No	648	21.75	5.35		
Yes	66	22.81	5.54		
Cash Assistance				.86	.354
No	700	21.82	5.39		
Yes	14	23.16	4.01		
Food Stamps				25.24	< .001
No	626	21.47	5.02		
Yes	88	24.49	6.87		

(continued)

	n	Mean	*SD*	*F*	*p*
Reduced Cost/Free School Meals				38.99	< .001
No	489	21.02	4.56		
Yes	225	23.65	6.45		
Recreation Center					
No	273	22.16	5.86	1.51	.220
Yes	441	21.65	5.04		
Sidewalks				.04	.850
No	131	21.93	5.87		
Yes	583	21.83	5.26		
Poorly Kept Housing				.49	.483
No	622	21.79	5.33		
Yes	92	22.21	5.62		
Parks or Playgrounds				.66	.415
No	116	22.22	4.65		
Yes	598	21.77	5.50		

Spearman's correlation coefficients were computed for the survey items (see Tables 26–28). Spearman's correlations are nonparametric correlation tests and were run because some of the survey variables had a non-normal distribution. The main purpose of these tables is to look for multicollinearity between the variables. Multicollinearity occurs when two variables are correlated at such a high level that the variables basically represent the same information. Multicollinearity is a concern for correlation coefficients over .80. Multicollinearity must be tested for before entering the variables into a structural equation model or before entering variables into a multiple regression. As can

be seen in Tables 26–28, no multicollinearity was observed between any pair of variables. Each number across the top of the table and down the first column refers to a survey item, which is listed in the note below the table. Significant relationships among the variables are marked with asterisks. Significant positive relationships indicate that higher scores on one variable are associated with higher scores on another variable. Significant negative relationships indicate that higher scores on one variable are associated with lower scores on another variable.

Table 26 shows the Spearman's correlation coefficients between the health care and insurance, child health, and poverty variables. Each of the 3 health care and insurance variables (1–3 in Table 26) were significantly related to each other, $\rho = .64–.77$, all p's $< .001$, indicating that a higher score on one variable was associated with higher scores on the other variables. Just over half of the child health variables were significantly related to each other (variables 4–8 in the table). The relationships between the child health variables ranged from no relationship to a relatively weak relationship. Each of the poverty variables (9–12 in the table) were significantly related to each other, $\rho = .15–.74$, all p's $< .001$, indicating that a higher score on one variable was associated with higher scores on the other variables. Most of the health care variables were significantly correlated with the child health and poverty variables. In addition, most of the child health variables were significantly related to the poverty variables. The notable exceptions are asthma and cash assistance, which are only significantly related to a few other variables.

Table 26

Spearman's Correlation Coefficients Among Health Insurance, Child Health, and Poverty Survey Items

	1	2	3	4	5	6	7	8	9	10	11
2	.77 ***										
3	.71 ***	.64 ***									
4	.16 ***	.15 ***	.01								
5	.31 ***	.29 ***	.35 ***	.09 *							
6	-.14 ***	-.17 ***	-.28 ***	.10 **	-.23 ***						
7	.08 *	.12 **	.08 *	-.01	.06	-.17 ***					
8	.03	.03	-.04	.09 *	.06	.19 ***	-.03				
9	-.09 *	-.07 +	-.18 ***	.06	-.07 +	.02	.01	.02			
10	-.01	-.01	-.34 ***	.12 **	-.13 ***	.21 ***	-.01	.07 +	.19 ***		
11	-.26 ***	-.28 ***	-.58 ***	.06 +	-.33 ***	.33 ***	-.13 ***	.02	.19 ***	.53 ***	
12	-.27 ***	-.31 ***	-.61 ***	.08 *	-.33 ***	.38 ***	-.15 ***	.06	.15 ***	.48 ***	.74 ***

Note. $^{+}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$; 1 = Does the child have health insurance?; 2 = Consistency of insurance coverage during past 12 months; 3 = Type of insurance coverage; 4 = Number of Preventative Health Care Visits; 5 = Place of Health Care; 6 = Overall Child Health; 7 = Delayed/Not Received Health Care; 8 = Asthma; 9 = Cash Assistance; 10 = Food Stamps; 11 = Reduced Cost/Free School Meals; 12 = Poverty Level

Table 27 shows the Spearman's correlation coefficients between the neighborhood survey items and BMI. Poorly kept housing was significantly and negatively related to having sidewalks (ρ = -.08, p < .05), and child safety in neighborhoods (ρ = -.16, p < .001), indicating that having poorly kept housing in the neighborhood was associated with not having sidewalks and parents' feeling that the child was not safe in the neighborhood. Poorly kept housing was significantly and positively related to people in neighborhood helping each other (ρ = .13, p < .001), indicating that having poorly kept housing was associated with people in neighborhood helping each other. Having sidewalks in the neighborhood was positively associated with having parks, playgrounds and recreation centers, ρ = .29–.31, p's < .001. Similarly, having parks or playgrounds was positively associated with having recreation centers, ρ = .29, p < .001. Neighborhoods with sidewalks were more likely to have recreation centers and parks or playgrounds. There was a significant but weak negative association between parks and playgrounds and people in neighborhood helping each other (ρ = -.08, p < .05), indicating that more parks and playgrounds was associated with less people in the neighborhood helping each other.

The variable of people in neighborhood helping each other was negatively related to child safety in neighborhoods (ρ = -.29, p < .001), was positively related to people in neighborhood I can count on (ρ = .53, p < .001), and was positively related to BMI (ρ = .09, p < .05). These findings indicate that people in neighborhood helping each other was associated with less feeling that the child is safe in the neighborhood, with more feeling that there are people in neighborhood I can count on, and with higher child BMI.

There was a significantly negative association between child safety in neighborhood and people in neighborhood I can count on (ρ = -.25, p < .001), indicating that feeling the child is safe was associated with fewer people to count on in the neighborhood. Finally, there was a significantly positive correlation between people in the neighborhood I can count on and BMI (ρ = .13, p < .001), indicating that being able to count on people in the neighborhood was associated with higher child BMI.

Table 27

Spearman's Correlation Coefficients between Neighborhood Survey Items and BMI

	13	14	15	16	17	18	19
14	-.08 *						
15	-.05	.31 ***					
16	-.06	.29 ***	.29 ***				
17	.13 ***	-.01	-.08 *	-.06			
18	-.16 ***	.01	.03	.03	-.29 ***		
19	.04	.04	-.05	-.04	.53 ***	-.25 ***	
20	.03	.00	-.06	-.04	.09 *	-.04	.13 ***

Note. $^{+}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$; 13 = Poorly Kept Housing; 14 = Sidewalks; 15 = Parks or Playgrounds; 16 = Recreation Center; 17 = People in neighborhood help each other; 18 = Child Safe in Neighborhood; 19 = People in neighborhood I can count on; 20 = BMI

Table 28 shows the Spearman's correlation coefficients between the health care or insurance, child health, and poverty variables with the neighborhood survey variables and BMI. The pattern of findings is described here, and the actual correlation coefficients can be seen in the table. The relationships between the health care or insurance variables and neighborhood variables ranged from no relationship to a weak relationship (ρ = .01–.15). The relationships between the child health and neighborhood variables all ranged from no relationship to a weak relationship (ρ = .01–19). Finally, the relationships between poverty and the neighborhood variables ranged from no relationship to a weak relationship (ρ = .01–.22). Within each set of variables, some relationships were positive, indicating that higher scores for one item are associated with higher scores for other items. Other relationships were negative, indicating that higher scores for one item are associated with lower scores for other items.

Table 28

Spearman's Correlation Coefficients Between Heath Care/Insurance, Child Health, and Poverty Survey Items by Neighborhood Survey Items and BMI

	13	14	15	16	17	18	19	20
1	-.11 **	.09 *	.05	.04	-.12 **	.05	-.09 *	-.10 **
2	-.13 ***	.07 +	.07 +	.02	-.14 ***	.08 *	-.14 ***	-.11 **
3	-.15 ***	.07 *	.01	.06 +	-.14 ***	.08 *	-.12 **	-.15 ***
4	.02	.00	-.02	.02	-.03 ***	-.03	-.02	.05
5	-.04	.08 *	.02	.02	-.14 ***	.07 +	-.14 ***	-.19 ***
6	.07	-.03	.00	.01	.12 ***	-.18 ***	.16 ***	.18 ***
7	-.05	.01	-.05	.01	-.02	.12 **	-.01	.02
8	-.01	.05	.00	.01	.03	-.12 **	-.04	.05
9	.04	.07 +	.04	-.01	.03	.03	.03	.06
10	.10 **	-.04	.02	.00	.05	-.04	.08 *	.15 ***
11	.11 **	-.09 *	-.01	-.01	.16 ***	-.08 *	.11 **	.21 ***
12	.17 ***	-.10 **	-.03	-.05	.16 ***	-.13 ***	.21 ***	.22 ***

Note. $^{+}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$; 1 = Does the child have health insurance?; 2 = Consistency of insurance coverage during past 12 months; 3 = Type of insurance coverage; 4 = Number of Preventative Health Care Visits; 5 = Place of Health Care; 6 = Overall Child Health; 7 = Delayed/Not Received Health Care; 8 = Asthma; 9 = Cash Assistance; 10 = Food Stamps; 11 = Reduced Cost/Free School Meals; 12 = Poverty Level; 13 = Poorly Kept Housing; 14 = Sidewalks; 15 = Parks or Playgrounds; 16 = Recreation Center; 17 = People in neighborhood help each other; 18 = Child Safe In Neighborhood; 19 = People in neighborhood I can count on in this neighborhood; 20 = BMI

Primary Analyses

Primary analyses were conducted to test the hypotheses of this study. Hypothesis 1-3: Neighborhood and environmental factors mediate the relationship between the latent variables of insurance and health care, childhood health, and poverty and the outcome variable of BMI in Texas.

The proposed model for this study is shown in Figure 1. For the model testing, separate confirmatory factor analyses (CFAs) were first conducted for each of the latent constructs in the model. The CFAs for health care, child health, and poverty all showed good fit as evidenced by a Root Mean Square Error Approximation RMSEA under .07. The CFA for the neighborhood variable showed two distinct factors. The first factor was comprised of the variables people in neighborhood help each other, people in neighborhood I can count on, and child safe in neighborhood. This factor was titled Neighborhood Relationships. The second factor was comprised of the variables neighborhood parks/playgrounds, neighborhood recreation center, and neighborhood sidewalks. This factor was titled Neighborhood Amenities.

Next, a measurement model was conducted on all latent constructs together with no directional arrows. Similar to the CFAs, the measurement model had good fit (RMSEA < .05), indicating that each item loaded well on its respective factor. Third, a structural model without demographic indicators was tested (see Figure 2). Overall, the paths between constructs (paths between circles in Figure 2) are nonsignificant and nonmeaningful. Mediation in the model would be indicated by paths from the health care or insurance, childhood health, and poverty variables to the neighborhood constructs and

from the neighborhood constructs to BMI being significant and by the overall model fit indices being adequate. Findings indicate that in the current sample, neighborhood factors did not mediate the relationship between health care or insurance, childhood health, and poverty to the outcome variable of BMI. This conclusion is further supported by the model fit indices (see Table 29).

Hypothesis 1-3 addressed not only potential mediation in the full sample but also in parent education, ethnic group, and employment. Although the demographic subsamples were unlikely to show good fit due to the poor fit of the overall model, the structural model was run on the subsamples to check for any good fitting models. The fit indices shown in Table 29 reveal that the model has very poor fit across the full sample and the subsamples. Adequate fit would be indicated by a RMSEA and SRMR $< .10$ and by a CFI and GFI $> .90$. The RMSEA and SRMR fit indices for the current full sample and subsamples were ≥ 1.00, and the fit indices are $< .01$ for CFI and are $< .25$ for GFI. Ideally, the chi square of a good fitting model would be nonsignificant, although chi square is highly influenced by sample size. When the sample size is large (> 500), an adjusted chi square (chi square divided by the degrees of freedom) of < 3 may be indicative of an adequate model fit. Although modifications, or allowing the error of certain survey items within factors, were allowed, the fit was still extremely poor across all samples.

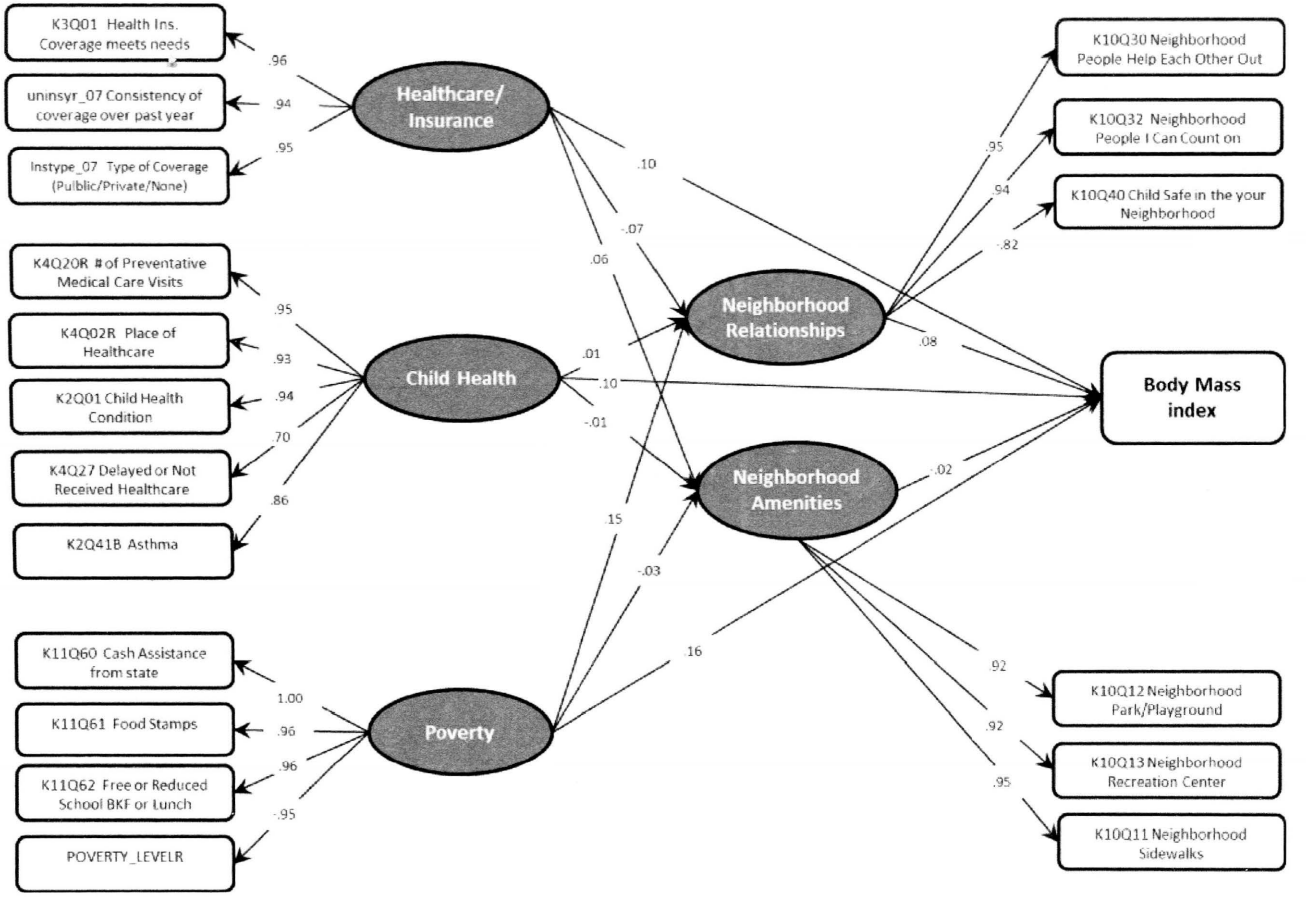

Figure 2. Structural Equation Model for Neighborhood as a Mediator between Health Care/Insurance, Child Health, Poverty and Body Mass Index

Table 29

Fit Indices of Sample Demographic Sub-Samples

	RMSEA	CFI	SRMR	GFI	χ^2	df	Adj. χ^2	*p*
Full	1.754	<.01	.633	.172	302,833.44	138	2,194.45	< .001
Hispanic	1.814	<.01	.896	.166	144,102.58	138	1,044.22	< .001
African American	1.894	<.01	1.178	.160	39,252.57	138	284.44	< .001
Caucasian	1.477	<.01	.722	.223	72,222.53	121	596.88	< .001
Mother High School	1.778	<.01	1.011	.168	59,919.62	138	434.20	< .001
Mother Less High School	1.910	<.01	1.296	.162	42,908.63	138	310.93	< .001
Mother High School Plus	1.47	<.01	.884	.231	98,973.110	105	942.60	< .001
Father High School	2.057	<.01	1.433	.144	48,031.93	138	348.06	< .001
Father Less High School	1.903	<.01	1.363	.159	33,607.11	138	243.53	< .001
Father High School Plus	1.390	<.01	.622	.238	88,780.64	121	733.72	< .001
Employed	1.786	<.01	.581	.169	286,253.19	138	2,074.30	< .001
Not Employed	1.883	<.01	1.356	.158	29,978.76	138	217.24	< .001

Hypothesis 4: Survey variables pertaining to health care, child health, poverty, neighborhood environment, and demographics predict overweight or obesity among Texas children.

Several steps were taken to test hypothesis 4. First, the calculated BMI variable was split into two other variables. Participants were coded as overweight or obese or not overweight or obese based on standard BMI guidelines, which categorize obese as at or above the 95th percentile for age, height, and gender and overweight as between the 85th and 95th percentiles (CDC, 2012b). The next step was to identify which variables to test as predictors of being overweight or obese. All the variables were not tested at one time in the final model due to issues with sample size and too much conceptual overlap in variables. To identify which variables to use in the model, a set of preliminary multiple linear regressions were conducted to actual BMI. In the first round, all survey items were added as predictors. In each subsequent analyses, the least predictive variable from each set of variables, based on the latent constructs from the model, were removed until only marginally significant and significant predictors of BMI remained.

Next, to test hypothesis 4, a multiple logistic regression was conducted to predict weight status from the identified predictor by using a series of multiple linear regressions (see Table 30). Variables were entered as two blocks. The first block included the survey items, and the second block included demographic items of interest along with survey items as predictors. Block 1 was significant, $\chi^2(5) = 68.37$, $p < .001$, predicting

12.9% of the variance in overweight or obese status (*Nagelkerke* R^2 = .129). In addition, the change from Block 1 to Block 2 was significant, χ^2 (5) = 21.90, p = .001, indicating that Block 2 does a better job of predicting overweight or obese status than that does Block 1. Block 2 was significant, χ^2 (10) = 90.28, p < .001, predicting 16.8% of the variance in overweight or obese status (*Nagelkerke* R^2 = .168). Specifically, children who were taken to an "other" place of health care, compared to those who went to the doctor's office for health care, were 2.79 times more likely to be overweight or obese (*OR* = 2.79, p = .002). Children who were taken to the hospital, compared to those who were taken to the doctor's office for health care, were 2.33 times more likely to be overweight or obese (*OR* = 2.33, p = .041). Having lower overall child health was associated with being 1.36 times more likely to be overweight or obese (*OR* = 1.36, p = .002). Using food stamps was associated with children being 1.90 times more likely to be overweight or obese, compared to not using food stamps (*OR* = 1.90, p = .011). Being Hispanic compared to being Caucasian was associated with the child being 1.97 times more likely to be overweight or obese (*OR* = 1.97, p = .002). Children being older was associated with lower odds of being overweight or obese (*OR* = .90, p = .008).

Table 30

Summary of Logistic Regression Predicting Overweight/Obese from Demographic and Survey Items

	B	*SE*	*Wald*	*Odds Ratio*	*p*
Block 1					
Other Place of Health Care (vs. Doctor Office)	1.138	.328	12.020	3.120	.001
Clinic or Health Center for Health Care (vs. Doctor Office)	.352	.220	2.566	1.422	.109
Hospital for Health Care (vs. Doctor Office)	.987	.399	6.109	2.683	.013
Overall Child Health	.401	.091	19.419	1.494	< .001
Food Stamps	.872	.244	12.772	2.392	< .001
Block 2					
Other Place of Health Care (vs. Doctor Office)	1.027	.335	9.423	2.793	.002
Clinic or Health Center for Health Care (vs. Doctor Office)	.255	.227	1.264	1.290	.261
Hospital for Health Care (vs. Doctor Office)	.845	.414	4.177	2.328	.041
Overall Child Health	.304	.096	10.018	1.356	.002
Food Stamps	.641	.252	6.440	1.898	.011
Hispanic (vs. Caucasian)	.676	.214	10.024	1.967	.002
African American (vs. Caucasian)	.375	.307	1.492	1.455	.222
Other Ethnicity (vs. Caucasian)	.138	.427	.104	1.148	.747
Age	-.104	.039	7.063	.901	.008
No Parent Employed Full Time (vs. at least one parent employed full time)	.494	.294	2.819	1.639	.093

Note. Model Summary: Block 1 χ^2 (5) = 68.37, $p < .001$, *Nagelkerke* $R^2 = .129$; Block 2 Change χ^2 (5) = 21.90, $p = .001$; Block 2 Overall χ^2 (10) = 90.28, $p < .001$, *Nagelkerke* $R^2 = .168$.

Summary

The results of the present study found the overall model to be not significant; however, overweight or obesity status was predicted and significant by place of health care, lower overall childhood health, use of food stamps, being Hispanic, and being older. In addition, having no parent who was employed full time was found to be marginally significant. In summary, a preliminary analysis was conducted to test the relationships among the demographic variables as well as the relationships between the demographic and dependent variables. Measures of central tendency, means, standard deviations, frequencies, and percentages were used to describe the sample. Relationships among categorical demographic variables were examined using cross tabulations with Pearson's chi square, and Cramer's V was used to check the strength of the relationship between variables. Continuous variables were tested for normality using the Kolmogorov-Smirnov test of normality. Relationships among continuous variables were tested using Pearson's product moment correlations. One-way ANOVAs were conducted to test for differences between the levels of categorical variables on the levels of continuous dependent variables. Lastly, homogeneity of variance was tested using Levene's Test for Equality of Variances. Findings from these results are further discussed in Chapter 5.

CHAPTER V

DISCUSSION, IMPLICATIONS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter will provide a summary and conclusions of this study, including the purpose of this study and which hypotheses were rejected or accepted. This chapter also will include a discussion of the significant findings of this study as they relate to the field of health education. Chapter 5 will also provide further exploration of the Social Ecological Model (SEM) as a possible theoretical framework for preventing and addressing childhood obesity. Finally, this chapter will include solutions for preventing and addressing childhood obesity, as well as recommendations for future studies and for health education practitioners.

Summary

The purpose of this secondary analysis was to examine associations between childhood obesity and other factors including poverty, child health, health insurance coverage, neighborhood environments, ethnicity, and parents' educational levels. This study utilized ex-post facto, cross-sectional data from the National Survey of Children's Health (NSCH) to identify factors that contribute to the prevalence of obesity among children who live in Texas. The NSCH was conducted in both English and Spanish by the National Opinion Research Center (NORC) at the University of Chicago between April 2007 and July 2008.

The NORC's survey, the NSCH, included a total of 100 items, but only a subset of the items was used in this study. The subset of items from the NSCH that was used in this study included items pertaining to child health, insurance coverage, poverty, neighborhoods and environments, body mass index (BMI), and demographic variables. The items from the NSCH that pertained to demographic variables and that were used in this study included items about gender, age, ethnicity, level of mothers' education, level of fathers' education, and whether or not at least one parent in the household was employed full time.

Conclusions

The first hypothesis in this study was to examine if neighborhood and environmental factors significantly mediate the relationship between healthcare and insurance factors and BMI of Texas children. According to the findings of this study (see Table 31), neighborhood and environmental factors did not significantly mediate the relationship between healthcare and insurance factors and BMI of Texas children.

The second hypothesis in this study was to examine if neighborhood and environmental factors significantly mediate the relationship between child health factors and BMI of Texas children. Based on the findings of this study (see Table 31), neighborhood and environmental factors did not significantly mediate the relationship between child health factors and BMI of Texas children.

The third hypothesis in this study was to examine if neighborhood and environmental factors significantly mediate the relationship between poverty and BMI of

Texas children. Based on the findings of this study (see Table 31), neighborhood and environmental factors did not significantly mediate the relationship between poverty and BMI of Texas children.

The fourth hypothesis of this study was to examine if variables related to demographics, healthcare, childhood health, poverty, and neighborhood and environment statistically and significantly predict obesity in Texas children. Based on the findings of this study (see Table 31), the variables related to demographics (ethnicity, employment/income, and age) and the independent variables (place of healthcare, overall childhood health, and food stamp assistance) significantly predicted obesity in Texas children.

Table 31

Conclusion of Results

	Decision Regarding Null Hypothesis (Null: No Effect on Obesity)	
	Fail to Reject	Reject
Hypothesis 1		
Neighborhood/Environment	X	
Healthcare/Insurance	X	
Hypothesis 2		
Neighborhood/Environment	X	
Child Health	X	
Hypothesis 3		
Neighborhood/Environment	X	
Poverty	X	

(continued)

	Decision Regarding Null Hypothesis (Null: No Effect on Obesity)	
	Fail to Reject	Reject
Hypothesis 4		
Demographics		
Parent Education	X	
Ethnicity		X
Employment/Income		X
Age		X
Healthcare		
Insurance Coverage	X	
Consistency	X	
Type of Insurance	X	
Childhood Health		
Preventative Visits	X	
Place of Healthcare		X
Overall Child Health		X
Delayed/Not Received	X	
Asthma	X	
Poverty		
Cash Assistance	X	
Food Stamps		X
Reduced Cost/Free School Meals	X	
Neighborhood/Environment		
People Help Each Other Out	X	
People I Can Count On	X	
Child Safe in Neighborhood	X	
Neighborhood Park/Playground	X	
Recreation Center	X	
Neighborhood Sidewalks	X	
Poorly Kept Housing	X	

Discussion

Although overall findings from the structural equation model were not significant (Hypotheses 1–3), the logistic regression that was conducted to test the fourth hypothesis did reveal significant predictors for being overweight or obese. The variables found to be predictive of obesity in this study included, ethnicity, employment/income, age, place of healthcare, overall childhood health, and food stamp assistance. In addition, the preliminary analyses revealed some interesting associations among the variables which will also be discussed in the following sections.

Demographic Variables

Ethnicity, gender, and age. The sample for this study was comprised of children who ranged in age from 10-17 (M = 13.80), with slightly more male (53%) than female (47%) participants. Although there were no major findings regarding gender, an intriguing result indicated that older participants had lower odds of being overweight or obese. This finding differs with the current obesity rates in the United States which are more pronounced today among both preschool children and adolescents (CDC, 2012a). According to the CDC, one in seven young children is obese and at risk for long-term health problems in adolescent years if there is no early age intervention. Although the reasons for adolescent obesity are complex and multifaceted, this age group's dietary patterns can contribute to weight gain or obesity, such as missing breakfast more often, consuming fewer fruit and vegetables, snacking more often, drinking more sugar-sweetened beverages, and selecting unhealthier food options more often, such as fast

food (CDC, 2012c). Physical activity patterns also tend to change and decline during adolescence, due to increased sedentary behaviors (CDC, 2012c). According to the National Center for Children in Poverty (NCCP; 2012), one adolescent out of every six is overweight, and one out of every three is at risk for becoming overweight, which can in turn lead to health complications such as diabetes, heart disease, high blood pressure, and cancer (CDC, 2011c). The Texas Diabetes Council (2001) also reported that children who have Type 2 diabetes are usually over 10 years of age, are overweight or obese, and are in middle to late puberty.

The ethnic composition of the research sample and the association between ethnicity and obesity were of primary interest. The ethnic composition of the research sample included Hispanics as the largest group (44.5%), followed by Caucasians (38.4%), African Americans (11.2%), and Multi/Other Ethnicity or non-Hispanics (5.5%). The results of this study revealed that Hispanic (41.5%) and African American (36.3%) children were two times more likely to be overweight or obese when compared with Caucasian (18.2%) children.

The finding that Hispanic and African American children were more likely to be overweight or obese is not surprising as many studies have identified a few ethnic groups, including Hispanics and African Americans, who are disproportionately affected with higher rates of overweight, obesity, and chronic illness (Braveman & Egerter, 2008; CDC, 2012a; RWJF, 2010; USDHHS, 2010). The findings of this study were consistent with the CDC (2012a) statistics that also report higher rates of overweight and obesity

among select ethic groups. According to the CDC (2012a), Hispanic boys and non-Hispanic, African American girls between the ages of 2–19 years old were significantly more likely to be obese than were their Caucasian counterparts.

Parental education and employment. In this study, parental education was one of the descriptive factors considered in relation to child obesity. In general, higher adult educational attainment (i.e., number of years or level of schooling) has been associated with many positive outcomes, such as better health for both parents and children, better employment (with benefits such as health insurance), and higher life expectancy (Egerter et al., 2009). Lower adult educational attainment (i.e., having less than a high school education) has been associated with negative outcomes, including poor health of children (Egerter et al., 2009). Results from this study coincided with these previously reported findings. In this study, a greater proportion of participants whose fathers and mothers had less than a high school education were overweight or obese when compared with those whose parents had more than a high school education. In addition, participants whose parents had higher levels of education had lower BMIs. For example, participants whose mothers and fathers had more than a high school education had lower BMIs (M = 21.16 and M=20.84, respectively) than those whose mothers and fathers had less than a high school education (M = 23.79 and M = 24.05, respectively). These results relate to findings discussed previously regarding the relationship between ethnicity and obesity. A much higher percentage of Hispanic mothers and fathers (24.5% and 25.6%, respectively) had less than a high school education when compared with Caucasian (2.7% and 3.3%,

respectively) and African American (6.0% and 5.6%, respectively) mothers and fathers. Egerter et al. (2009) reported similar findings with Hispanic adults (40%) being more likely to have less than a high school education compared with Caucasian (11%) and African American (20%) adults. Results from this study seem to indicate that ethnicity may be a more important indicator than parental education in predicting obesity in children. However, results from this study also indicate that ethnicity and parental education are interrelated, signifying that further research is necessary to separate the effects of ethnicity from those of parental education on child obesity. Further research into the relationships between ethnicity, parental education, and childhood obesity is essential to determine if ethnicity, not parental education, is truly a more significant predictor of obesity in children.

Parental work status was another descriptive factor that was considered in relationship to childhood obesity in this study. The overall percentage of children in this sample who did not have at least one parent employed full time (8.7%) was slightly lower than that of the 2010 projected US Status (11%; Speer et al., 2011). However in this study, the results revealed differences between participants who did and did not have at least one parent employed full time. Over half of participants without at least one parent employed full time were overweight or obese, compared to the less than 30% of participants with at least one parent employed full time. In addition, participants who had at least one parent employed full time had lower BMIs ($M = 21.58$) than did those without at least one parent employed full time ($M = 24.63$). Findings indicated that

children who lived in households without at least one parent employed full time were 1.5 times more likely to be overweight or obese compared with those who lived in households with at least one parent employed full time.

Findings from this study appear to indicate that parent work status, along with parental education level, are related to ethnicity. A greater proportion of Caucasian participants (96.7%) had at least one parent who was employed full time than did Hispanic (86.8%) and African American (87.5%) participants. However, unlike parental education, both ethnicity and parent work status were predictors of obesity status. Results from the logistic regression indicated that children who had no parent working full time had higher odds of being obese, but this finding was only marginally significant. More interesting, perhaps, is the finding that even when controlling for the effect of parent work status, ethnicity (specifically being Hispanic) was associated with significantly greater odds of being obese *(OR* = 1.97, p = .002).

These findings shed light on the compounding influence of gaps in parental education between the ethnic groups and levels of employment. Regardless of ethnicity, socioeconomic factors, such as being low-income and having low education status, can negatively affect health at all ages, starting with premature births and low-birth weights (Braveman, Sadegh-Nobari, & Egerter, 2008). Parents who have less education may not have the resources needed to provide optimal environments for their children and may have to reside in low-income neighborhoods, which in turn can affect the overall health of themselves and their children (Egerter et al., 2009). Though further research is

necessary to better understand the role of parental education and employment in relation to childhood obesity, it is well known that economic factors can positively impact and improve one's life.

Model Latent Constructs

Healthcare. In this study, nearly 20% of participants who were uninsured were overweight or obese, compared with 12% of insured participants. Compared with another study's results (17%), the percentage of uninsured children in Texas who are overweight or obese is slightly higher in this study and doubles the percentage reported at the national level (10%; Kaiser Family Foundation, 2012). As expected, a higher percentage of participants whose mothers had less than a high school education did not have health insurance (34.9%) compared with those whose mothers had a high school education (18.1%) or more than a high school education (8.2%). These findings are important because uninsured children are 10 times more likely to have unattended medical needs, which can contribute to serious long-term health conditions such as asthma, diabetes, and obesity (Children's Defense Fund, 2012).

In this study, 30.5% of participants who were overweight or obese used public health insurance compared with only 18.4% of participants who were not overweight or obese. Nearly 70% of participants in this study who were not overweight or obese had private health insurance, compared with only 50.5% who were overweight or obese. Haas et al. (2003) found similar results and concluded that adolescents who had no insurance or who had public insurance were more likely to be overweight than were those who had

private insurance. Wen et al. (2012) reported that from 2004–2008, there was a more noticeable decline in obesity among children (< 6 years) who were insured by health plans other than Medicaid than among children who were insured by Medicaid. According to Wen et al. (2012) the reason for the decline in obesity among children who were insured by a non-Medicaid plan is unclear; however, household income and lifestyle could play a role. Families with a higher household income that are typically covered by a non-Medicaid plan tend to have more access to health services, live a healthier lifestyle and reside in better living environments. Whereas, low- income families that are covered by Medicaid, may live in a more disadvantaged environment, which can impact their health (Wen et al., 2012). According to the Children's Defense Fund (2012), children who lack insurance are five times more likely to not visit a physician for more than two years when compared with children who have insurance. A lack of health insurance negatively impacts the ability to prevent and treat health conditions like obesity.

Childhood health. In this study, place of healthcare was assessed in relation to children's weight status. Nearly 22% of participants in this study who were overweight or obese used public clinics or healthcare centers. Stettler, Elliott, Kallan, Auerbach, and Kumanyika (2005) reported similar findings with 23% of overweight or obese participants (children between the ages of 2–11 years) using community health centers. Results from this study revealed that participants who were taken to an "other place of healthcare" were three times more likely to be overweight or obese than those who received care at a physician's office. In addition, children who utilized hospitals for

healthcare were two times more likely to be overweight or obese than children who received care at a physician's office. Buescher, Whitmire, and Plescia (2008) reported similar results and concluded that children who utilized public health clinics and community health centers instead of private practitioners were at a much greater risk for obesity. Buescher et al. also found that adolescents who were at-risk for becoming overweight (33%) and adolescents who were overweight (25%) had more Medicaid expenditures than did adolescents who were not overweight or obese, which could be an indication of more healthcare visits because of their health conditions.

Ethnicity and place of healthcare. Data indicated that Hispanic participants (25.2%) used clinics at health centers more often than Caucasian (11.7%) and African American (10.0%) participants. A lower proportion of Hispanic parents (61.6%) utilized physicians for their children's care compared with African American (67.5%) and Caucasian (85.0%) parents. African American parents used hospital emergency rooms in outpatient settings more often (10.0%) than Hispanic (4.7%) and Caucasian (1.1%) parents. Specific to the use of emergency departments for healthcare, nearly one in four African American parents reported a child with asthma (23.8%), a significantly higher percentage when compared with Hispanic (7.5%) and Caucasian (7.7%) parents. These findings are consistent with data from the CDC, showing the highest prevalence of asthma among African American children (Kirk & Li, 2009).

Several studies have linked asthma and obesity. Wang and Dietz (2002) reported an increase in hospital discharges that were related to both asthma and obesity.

Researchers in the same study concluded that during 1979–1981, the rate of asthma as an obesity-associated comorbidity was 5.9% and increased to 8.1% in 1997–1999. They also concluded that asthma was the most common primary diagnosis in cases where obesity was listed as the secondary diagnosis, which is another indication of the link between the two conditions (Wang & Dietz, 2002). Hasan et al. (2006) reported that asthmatic children were nearly 1.5 times more likely to be overweight compared to non-asthmatic children. Hasan et al. (2006) also suggested that, although the exact nature of the relationship between asthma and obesity remains unclear, the cause could be attributed to a decrease in physical activity. Saha, Riner, and Liu (2005) reported that both overweight boys and girls had higher odds of having asthma compared to their normal weight counterparts (3.1 and 1.8 times, respectively). In this same study, African American boys who were younger and overweight had the highest likelihood of having asthma, whereas Caucasian girls who were older and normal weight were less likely to have asthma (Saha et al., 2005).

Buescher et al. (2008) reported that overweight adolescents were more likely to have a medical claim paid by Medicaid for a primary diagnosis of obesity ($p < .001$) and were also more likely to have a higher percentage of medical claims for asthma, diabetes, and other respiratory conditions than were their counterparts of normal weight ($p < .05$). These findings are important because public health clinics and community health centers often serve low-income populations and play a vital role in healthcare delivery (Buescher et al., 2008). According to Stettler et al. (2005), community health centers are commonly

located in inner-cities or rural areas where there is a lack of access to healthy foods and limited opportunities for physical activity. Thus, children who live in these limited communities are at an increased risk for obesity (Stettler et al., 2005). Public, state-funded, healthcare insurance programs, such as Medicaid, that primarily serve low-income populations also play an important role in preventive healthcare.

As previously noted, parents' lack of employment was associated with children being overweight or obese. Unemployed parents may not have the healthcare benefits needed to see a private physician and, in turn, may rely on other sources of healthcare. Scheppers, van Dongen, Dekker, Geetzen, and Dekker (2006) reported that a lack of financial resources is a barrier that delays or affects receiving healthcare. However, in one study among Hispanics, the primary reason given for the lack of a regular healthcare provider was not related to cost but more to the belief that visiting a provider was unnecessary because the individual was rarely sick (Livingston, Minushkin, & Cohn, 2008). In this same study, 13% of respondents also stated that they preferred to treat their own medical needs, and 8% believed that folk medicine had a role in their healthcare. A large percentage of Latinos in the same study also concluded that their sources of health information were obtained through media, family, friends, church, and their communities (Livingston et al., 2008). According to Scheppers et al. (2006), ethnic minorities may try to resolve any health issues among themselves or through a close circle of family and friends prior to seeking health services. According to the findings of the Behavioral Risk Factor Surveillance System (BRFSS) surveys (2001–2002) of the CDC (2004), Hispanics

were significantly less likely than non-Hispanics to have healthcare coverage, to have one or more healthcare providers, or to have a regular place of healthcare. This population was also significantly less likely to have been screened for cancer or preventive type vaccinations (CDC, 2004). Though the BRFSS survey was administered to adults, these findings are important because the trends of delaying or not receiving healthcare are similar among adults' healthcare practices for their children. The lack of seeking or receiving healthcare may contribute to poorer health status and higher rates of morbidity and mortality (CDC, 2004). Therefore, further research is necessary in order to fully understand the link between place of healthcare, type of healthcare, and reasoning to seek care in relation to childhood obesity among minorities.

The results from the current study revealed that children with lower overall health scores were approximately 1.5 times more likely to be overweight or obese. These results are important because research indicates that a healthy child is more likely to become a healthy adult (Braveman & Egerter, 2008). Healthy children tend to become ill less often, attend more days of school, and learn more readily than unhealthy children (CDC, 2012g). The increase in Type 2 diabetes among children and adolescents has become a national public health concern (Copeland et al., 2005; Trevino et al., 2004). Parents and guardians in this study did not report high numbers of children with diabetes, which could be why this condition was not a significant predictor of obesity. However, children who participated in this study and were obese are at greater risk for diabetes. A

high BMI can contribute to a greater risk for insulin resistance, which can lead to diabetes and other serious medical problems (CDC, 2012b).

Poverty. In the current study, Hispanics ($M = 4.16$) and African Americans ($M = 4.76$) had higher poverty levels than Caucasians ($M = 7.12$). In most cases, a family qualifies to receive food stamps due to unemployment or lack of resources to provide enough food for family members. Participation in the Supplemental Nutrition Assistance Program (SNAP, formally known as the food stamp program), has not been shown to contribute to overweight or obesity in children. Ver Ploegm, Mancino, Lin, and Guthrie (2008) examined data from the 1976–2002 National Health and Nutrition Examination Surveys (NHANES) and found no evidence of a consistent relationship between childhood obesity and participation in the SNAP or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Though studies have not revealed a link between participation in one of these programs and BMI in children, some evidence suggests that adult women who participate in the SNAP over a certain length of time may have a higher body mass index (Ver Ploeg, & Ralston, 2008). Results from the current study revealed that nearly 12% of participants were enrolled in the food stamp program, and a greater percentage of overweight or obese participants (21.8%) received food stamps compared with non-overweight or obese participants (8.1%).

The SNAP, WIC, and the National School Lunch Program are federally funded programs that provide food for children who live in households with limited resources (Dinour et al., 2007; Ver Ploegm et al., 2008). In the current study, nearly 32% of the

participants received free or reduced school lunch. Gleason and Dodd (2009) reported that the national school meal program did not contribute to the increase in obesity; however, in the current study, a greater number of overweight and obese participants (51.4%) received free or reduced cost school lunches than did non-overweight or obese participants (22.7%).

Texas is considered the second most food insecure state in the nation, with 24.3% of children living in poverty, compared to the national rate of 20.0% (SAFB, 2009). Texas household food insecurity (18.8%) also exceeded that of the U.S. average (14.6%) in 2008–2010 (Feeding America, 2012). Families who are struggling financially are at high risk for experiencing food insecurity (Holben, 2006). Although food insecurity creates a nutritional environment of high calorie, low nutrient-dense foods, most studies have not found a link between food insecurity and obesity (Larson & Story, 2010).

Yet, poorer health status is a risk of consuming foods with high calories and few nutrients. Additionally, children may overeat when there is a food surplus (Casey et al., 2006; Holben, 2006; Larson & Story, 2010). According to Dinour et al. (2007), the lack of association between food insecurity and overweight among children may be due to parental protection, where, caregivers or low-income mothers go without eating or find resources so that their children will have sufficient food. Although the results in the current study revealed that children who received state assistance, such as food stamps, were nearly twice as likely to be overweight than those who did not receive food stamps, the reasons remain unclear and are most likely multifaceted. The findings regarding

poverty and use of state assistance are important for future studies because both poverty and use of state assistance relate to poor health status and increased BMI.

Neighborhood/Environment. Physical activity is a key component in preventing childhood obesity and chronic illness. However, according to Active Living by Design (n.d.), people who live in low-income communities often report poor access to parks and recreational facilities where they can exercise. Respondents from the current study also reported several neighborhood and environmental factors that could contribute to their lack of physical activity. For example, 38% of participants reported no access to a recreational center, 18% reported having no sidewalks in their neighborhood, 16% reported no access to a park or playground, and nearly 13% felt as though their neighborhood housing was poorly kept. These responses are similar to the most common reported barriers to increased physical activity among residents in low-income communities.

Emerging research continues to indicate that a disadvantaged neighborhood environment can contribute to overall poor health and can potentially increase the risk of obesity. One recent study revealed differences between children who lived in a neighborhood environment that was supportive of healthy eating and physical activity and children who resided in an environment that was not supportive (Saelens et al., 2012). Researchers in the same study described an "obesogenic environment" as an environment that lacks access to healthy foods and opportunities for physical activity (Saelens et al., 2012, page 62). A supportive environment was described as an

environment that had access to a supermarket, had fewer fast food restaurants, had more walking space, and had access to a higher quality park. Saelens et al. (2012) concluded that children who lived in neighborhoods with a supportive environment for both physical activity and nutrition had 37% lower odds of being overweight ($p = 0.08$). Similarly, children who lived in supportive environments had 56% lower odds of being obese ($p = 0.02$) than children who lived in non-supportive environments.

An interesting finding of this current study is that more Hispanic participants (42.8%) reported no use of (or access to) a recreation center than Caucasian (39.4%) and African American (18.8%) participants. Safety is another factor that must be considered in an assessment of physical activity. In this study, Caucasians were more likely to report their children were safe in their neighborhood ($M = 3.49$) than Hispanics ($M = 3.30$) or African Americans ($M = 3.12$). Although more Hispanics did not feel that their children were safe in their neighborhood, they did report a greater sense of support and community in their neighborhoods than African Americans and Caucasians. Hispanics ($M = 1.83$) and African Americans ($M = 1.96$) were more likely to report that people in their neighborhood would help each other than Caucasians ($M = 1.62$). Hispanics ($M = 1.56$) and African Americans ($M = 1.76$) also believed that they could count on people in their neighborhood to a greater extent than Caucasians ($M = 1.31$). Although it is unclear why Hispanic parents in this study reported more neighborhood and environmental barriers than African American and Caucasian parents, results do suggest that Hispanics are more likely to report more barriers and to perceive their neighborhood to be unsafe

more often than other ethnic groups. Duke, Huhman, and Heitzler (2003) reported that Hispanic parents (41.2%) cited safety as a barrier to physical activity more often than African American (13.3%) or Caucasian (8.5%) parents. Duke et al. (2003) also reported that Hispanic and African American parents commonly reported lack of opportunities as a barrier to physical activity more often than Caucasian parents.

The findings of this study are important to the broader understanding of how environments can hinder or enhance childhood health. Future research should explore not only the impact of living in an obesogenic environment but also the perceptions regarding opportunities for safety and physical activity among minority families and the association between these factors and childhood obesity.

Implications for Health Education

One of the goals of Healthy People 2020 is to reduce the proportion of children and adolescents who are overweight or obese (USDHHS, 2011). Additionally, a newly set goal set by the White House Task Force on Childhood Obesity (2010) is to reduce the national childhood obesity rate to 5% by 2030. In this study, the associations between childhood obesity and household income, neighborhood and environment, healthcare coverage and use, and parental education and employment in Texas were examined. Results of this study add depth to other findings regarding the disproportionate effect of childhood obesity and chronic illness among certain ethnicities (CDC, 2012a; National Diabetes Education Program, 2008; RWJF, 2010). Results provide insight into potential health barriers that still exist for low-income minority children and families. Specific to

this study, Hispanic children who were low-income, whose parents lacked employment and sufficient income and received state assistance, and who had poorer health were more likely to be overweight or obese. Caucasian children who participated in this study were less likely to be overweight or obese, were more likely to have at least one parent with more than a high school education who was employed full-time, and were less likely to be receiving state assistance. Findings from this study were not conclusive as to the influence of neighborhood and environmental factors on childhood obesity. Nevertheless, health professionals must fully understand the dynamics of working with low-income populations who live in poor environments that are not supportive of healthy lifestyles. Understanding neighborhood and environmental barriers and challenges faced by low-income families can provide health professionals with the information necessary to develop targeted policy-driven interventions to reverse and prevent childhood obesity.

Theoretical Framework

Research and evidence continue to indicate the need to work toward a multilevel approach to improve the health of populations (Sallis & Owens, as cited in Glanz et al., 2002). Using SEM to study childhood obesity is an example of utilizing a multilevel approach to work toward this improvement. The purpose of SEM is to focus more closely on environmental causes of behavior with identification and selection of environmental interventions (Sallis & Owens, as cited in Glanz et al., 2002). Social change efforts using a multilevel approach have been successful in initiatives for tobacco use, seat belt and car seat use, recycling, breastfeeding, and obesity (Gooze, Hughes,

Finkelstein, & Whitaker, 2010; Huang, Drewnowski, Kumanyika, & Glass, 2009; Sallis & Owens, as cited in Glanz et al., 2002). Several of these initiatives for social change included specific components that have been shown to be effective, such as government engagement, mass communication, environmental and policy change, and coalition involvement (Sallis & Owens, as cited in Glanz et al., 2002).

Though all five levels of SEM are equally important and build on each other, developing public policy is also important to sustain communities' efforts at social change. Members of WHO (2010) suggest that addressing childhood obesity will require policies and interventions that focus on socioeconomic determinants of health, such as lack of access to healthy diets and lack of opportunities for physical activity. The Leadership for Healthy Communities (2009), an organized group of the Robert Wood Johnson Foundation, created a list of comprehensive polices to support healthy eating and active living for communities and schools. Members of communities can use this list to improve the following environmental issues that affect health: improve safety for bicyclists and pedestrians, expand biking and walking trails, improve community designs, increase access to open spaces and recreational centers, promote safe and crime-free communities, implement healthy corner stores and mobile markets, and involve restaurants in a menu labeling initiative and low-fat food choices. Members of school districts can also use the list of policies created by the Leadership for Healthy Communities to improve the following educational issues that affect health: implement quality programs for physical activity, require certification for physical education

teachers, encourage schools to implement safe walking routes programs, work toward joint-use agreements (agreements in which schools allow communities to use their playgrounds during after-school hours), offer healthy foods and beverages for all foods provided or sold, implement farm-to-school and in-school garden programs, require certification for health education teachers, and regulate unhealthy marketing to youth. Addressing policy not only helps to remove obstacles and barriers to healthier lifestyles but also empowers and strengthens people's abilities to make healthy choices and decisions (Levi, Vinter, Richardson, St. Laurent, & Segal, 2009).

Limitations

This study did have several limitations. Data were limited to parents and guardians in Texas who had household access to a phone and who were randomly selected to participate in the study's survey. In addition, the survey was only completed by parents and guardians who agreed to participate and, as such, participants may represent a more motivated subset of the population. Consequently, survey responses may not represent demographics, characteristics, or socioeconomic factors of the larger population in Texas. Only self-reported data about height and weight for 847 children between the ages of 10–17 years were collected in this study. Survey questions were limited by study protocol and did not ask parents and guardians about their families' beliefs, traditions, or cultural practices regarding body image, healthy lifestyle, physical activity, and food practices, all of which could influence the results. Survey questions did not ask the participants about physical elements of their built environments that

support active and healthy lifestyles, such as access to fresh fruits and vegetables (community gardens, mobile markets, farmers' markets, full service grocery stores) and to open spaces (nature centers, camp grounds, ball fields, and picnic areas). This could be a reason why results from this study indicated that environment did not, as hypothesized, mediate relationships with other variables. Given the sampling limitations, the results from this study should not be generalized to the entire population. Additional studies are necessary across Texas and in cities with the highest rates of childhood obesity to substantiate the findings of this study.

Recommendations

In this study, several interesting findings were revealed that may provide clarity to current and future researchers and health educators about variables that may contribute to childhood obesity. Quantitative methods were utilized in this study to determine the degree to which ethnicity, age, use of food assistance from the state, and employment were associated with childhood obesity. Hispanic and African American children were more likely to be overweight and obese than Caucasian children, indicating the need to address the barriers to good health for these populations. Thus, it is critical to further examine the extent to which Hispanic and African American families struggle to support themselves and their beliefs in preventing obesity and chronic illness. Future studies should focus on factors that contribute to childhood obesity in minority populations, including parental income, employment, access to healthcare coverage and place of healthcare. As a large majority of the overweight and obese children who participated in

this study were Hispanic and had parents who did not have high school educations, future research should also address educational attainment in relation to childhood obesity.

Health educators play a huge role in working with our minority families in schools, communities and healthcare settings. Low-income families tend to use healthcare providers less often for various reasons, thus, future research could focus on understanding what prompts them to visit doctors' offices, healthcare clinics, community health centers or emergency rooms. Providing health education to this population on the importance of preventative visits and maintaining a consistent routine of well child checks is imperative to preventing childhood obesity and other chronic conditions.

Schools play a central role in preventing and reversing childhood obesity. Health educators should be encouraged to work with schools in creating healthier school environments. It is important that the health educator become fully informed of federal and state level wellness policies that schools are required to implement for nutrition, health education and physical education. Health educators should work through the local school board, district leadership team, the school health advisory council, parents, school principals and the community to implement or strengthen policies and strategies that are sustainable and that create a healthier school environment.

Although neighborhood and environmental variables in this study were not significant predicators of obesity, researchers continue to cite common barriers to good health in low-income communities, such as unsafe neighborhoods, poor access to parks and recreational facilities, air pollution, lack of time, poor health, and lack of support for

exercise (Active Living by Design, n.d.). Hispanics in this study perceived their neighborhoods to be less safe, which can in turn affect their children's ability to be more active. Health educators can play a significant role in ascertaining and addressing perceptions and beliefs of community members and can also be a resource to families in creating safe neighborhoods. Thus, environmental factors that may influence obesity rates among minorities need further research.

Health educators who develop policy-driven interventions to reverse and prevent childhood obesity in communities can work to identify the needs of the community, collaborate with key stakeholders and mobilize and leverage resources. Collaboration is important in addressing obesity in communities. As such, health educators should work with local and state health departments, community organizations, health and academic professionals, non-profit organizations, and families that live in the community to offer the most comprehensive strategy for prevention of childhood obesity.

Research continues to indicate that a combined, multilevel approach between individuals, communities, and environments is the most effective intervention to promote behavioral change (Sallis & Owens, as cited in Glanz et al., 2002). One challenge to multilevel approach interventions is that health professionals tend to develop programs that are targeted at individuals and therefore are less familiar with strategies and policies that address all levels (Sallis & Owens, as cited in Glanz et al., 2002). Using a multilevel approach is more time consuming and demanding and can take years to produce positive changes, which can also be discouraging for health professionals. Thus, researchers and

health educators should be encouraged to develop future research designs based on SEM so that environmental causes of behavior can be further identified and appropriate tailored interventions can be implemented (Sallis & Owens, as cited in Glanz et al., 2002).

Insights from this and future studies about childhood obesity and its causes would benefit health educators and professionals who play important roles in developing and implementing health interventions to support families, schools, and communities. Hopefully, the findings from this study will further inspire and urge policymakers, advocates, and community leaders to find solutions to prevent childhood obesity and to create a healthier Texas for children and families.

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APPENDIX A

BODY MASS INDEX FOR AGE CHART

BMI-for-Age	
Weight Category	Percentile Range
Underweight	Less than the 5th percentile
Healthy Weight	5th percentile to less than the 85th percentile
Overweight	85th to less than the 95th percentile
Obese	At or greater than the 95th percentile

Note. Retrieved from Centers for Disease and Control and Prevention (2012b)