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Neighborhood-Level Predictors and Obesity Among African-American Children

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Abstract

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MPH, Kaplan University, 2014

BEd, Ahmadu Bello University, 1991

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of the Requirements for the Degree of

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Abstract

The steady raise in childhood obesity is a major public health problem nationally and globally. Childhood obesity is primarily caused by an imbalance between caloric intake and caloric expenditure. The increase in childhood obesity rates over the past 3 decades suggested involvement of environmental and behavioral factors in the obesity epidemic. While childhood obesity is considered a public health crisis in the United States, only limited research is available about the potential impact of neighborhood-level factors such as access to healthy food, neighborhood safety, and risk-free outdoor playgrounds. The purpose of this study was to examine if any relationships existed between childhood obesity and type of diet, level of physical activity, and neighborhood-level risk factors and childhood obesity. This study accessed the California Health Interview Survey (CHIS) 2009-2014 data sets. Chi-square tests and multivariate logistic regression were used to evaluate the associations between independent and dependent variables. The Wald test was used to assess the effects of each individual predictor, while adjusting for other predictors. The findings of this study showed no significant associations between childhood obesity and neighborhood safety; parental educational level; presence of parks, playgrounds, or open spaces; neighborhood walkability; neighborhood safety and support; and gender. Low physical activity levels, however were a significant risk factor for increase obesity. This study may lead to positive social change, enhancing individual lives and whole communities, by drawing the awareness of public health officials and policy makers to the importance of neighborhood factors associated with high body mass index.

Assessing the Impact of Neighborhood-Level Predictors on Obesity Among African-American Children

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Dedication

I dedicate this dissertation to my children, Chinenye, Ugochi, Emeka, and Chidozie, for their amazing support throughout my doctorate program. I also dedicate this page to the memory of my parents, Hillary and Priscilla Onyeka, who taught me the power of education. To God be the Glory.

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Chapter 1: Introduction to the Study

Childhood obesity continues to be major health problem for children in the United States. Obesity can have significant negative effects on children's health behaviors, thus leading to poor health and even death (Davison, Jurkowski, Li, Kranz, & Lawson, 2013). Environmental factors surrounding the child's neighborhood have been found to have the greatest influence on their health behaviors (Carroll-Scott et al., 2015). Despite the fact that all states within the United States are taking considerable measures to address the problem of obesity, only a few interventions have focused on the influences common to a child's environment (Davidson et al., 2013; Karnik, & Kanekar, 2015; Saelens et al., 2012). Emerging evidence indicates that these factors have considerable influence on the children's physical activity (Maitland, Stratton, Foster, Braham, & Rosenberg, 2013; Sallis, Floyd, Rodríguez, & Saelens, 2012).

It is important to study the different neighborhood-level factors that predispose children to obesity. The identification of these neighborhood-level factors could form the basis for the development of obesity control and preventative interventions to assist in the fight against childhood obesity in the United States (van Hulst et al., 2015). Previous researchers have recommended the development of effective preventative interventions at school, in the neighborhood, and at home to address the problem of childhood obesity (Davidson et al., 2013). Children residing in different environmental settings, especially those in urban areas, face challenges with obesity. Although psychosocial, behavior-modification and medical interventions are on the increase to treat childhood obesity,

inadequate and ineffective standard interventions remain public health concerns (van Hulst et al., 2015).

Lifestyle changes and drug interventions for childhood obesity have become ineffective in preventing the upward trend of obesity. This has resulted in the increase of *bariatric* surgery in morbidly obese children. In past years, health care providers treated obesity in isolation from other health problems such as physical and emotional problems. However, obesity has similar symptoms, including sleep disorders, sedentary behavior, and unregulated food intake (Reeves, Postolache, & Snitker, 2008). To prevent childhood obesity, it is crucial that further studies be conducted on the various aspects of the environment to which children are exposed because different aspects of environmental exposure play important roles in maintaining health into adulthood (Davison et al., 2013). Through recognizing various types of environments in which children tend to thrive, health care officials can create important strategies and interventions that target a particular population (Reeves et al., 2008). As an important strategy in combating childhood obesity, the White House Task Force on Childhood Obesity (WHTFCO, 2010) recommended that schools and various community organizations establish early preventative interventions.

Furthermore, since health events during childhood could have lifelong effects, social change can be directed to making changes in the environment, which could in turn effectuate changes in societal structures as well as in individual relationships. A reduction in the rate of childhood obesity may also decrease the cost of health care due to the numerous obesity-related comorbidities (Reeves et al., 2008). This study could contribute

to positive social change by improving the understanding of neighborhood factors that influence childhood obesity, thus guiding the development of effective obesity-prevention strategies for children. This study may also improve the parents' knowledge regarding neighborhood-level factors that predispose children to obesity and encourage healthy eating and physical activity behaviors among the children (Davison et al., 2013).

This chapter contains the background of the research problem, the problem statement, the purpose of the study, the research questions posed for the study, the hypotheses tested, the theoretical foundation, and the nature of the study. Additionally, I provide a discussion of the scope of the study, its limitations, delimitations, significance, and assumptions.

Background

It is estimated that 17% of children in the United States are obese (Ogden, Carroll, Kit, & Flegal, 2014). Although the rate of childhood obesity has stagnated over the past 3 decades, obesity is still a major health concern nationally and worldwide, especially among minority ethnic groups and populations in rural areas (Ogden et al., 2014). In California, the estimated number of overweight children, aged 2-5 years, was 16%, and approximately 17.2% of them were considered obese (Centers for Disease Control and Prevention [CDC], 2014a). Obesity results from an energy imbalance in the human body, when the caloric consumption is greater than the energy expenditure (Mackenbach et al., 2014c). While most of the past research has focused on this energy imbalance as the primary cause of obesity, there are other environmental, genetic, and behavioral factors to consider that can result in childhood obesity (CDC, 2014b). According to the CDC

(2014b), the immediate environment in which children grow up can have a considerable effect on their diet and physical activity, thus influencing their risk of developing obesity.

This section provides a detailed background on childhood obesity in the United States, factors associated with obesity, and the neighborhood-level factors that influence the risk of obesity and overweight among children. Irrespective of age, ethnicity/race, and gender, the prevalence of obesity and overweight in the United States is quite alarming (Hamid, Islam, & Chanraray, 2013). Researchers have identified childhood obesity as the major public health concerns affecting children today (Raychaudhuri & Sanyal, 2012).

Measuring Childhood Overweight and Obesity

According to Nemiary, Shim, Mattox, and Holden (2012), obesity is an excess of human body fat. The way or how individuals become overweight or obese remains complex and is not completely understood. The causes of obesity are multifactorial, and so are the chronic health effects due to interactions between children within their environment and genetic dispositions (CDC, 2016a; Crawford et al., 2010). Generally, the causes of obesity are classified as either modifiable or nonmodifiable factors. The modifiable-risk or preventable factors of childhood obesity are attributed to insufficient or lack of regular physical activity, increased consumption of high-calorie foods, a sedentary lifestyle (increased time spent watching television and playing video games), low family income or unemployed parents, and frequent media advertisements of high-calorie foods (Deckelbaum & Williams, 2001; Huffman, Kanikireddy, & Patel, 2010). Because the causes of obesity are modifiable, obesity is a treatable disease. Childhood obesity is primarily due to insufficient or lack of routine exercise and unhealthy eating

habits, which amount to excessive energy consumption or lack of energy expenditure or a mixture of both, resulting in increased energy imbalance (CDC, 2014a). Individuals may be predisposed to obesity by their genetic factors, in addition to disparities with body mass index (BMI; Fawcett & Barroso, 2010). However, the increased prevalence of childhood obesity in many developed counties is not solely due to genetic influences. Parental obesity is the most influential obesity risk factors for obesity in children (Llewellyn, Trzaskowski, Plomin, & Wardle, 2013). The risk of childhood obesity is increased with two obese parents (Vos & Welsh, 2010). According to Cheung and Mao (2012), a strong link between genetics and obesity is an individual's fat-mass and obesity-related gene.

Findings by O'Rahilly and Farooqi (2008) in the "Twins' Early Development Study (TEDS)" showed that approximately 40% -77% differences in human body weight are hereditary. Genes such as BDNF, SH2B1, and NEGR1 indicate a connection between disorder in the brain's regulatory system and obesity, thereby impairing satiety (Cheung & Mao, 2012). Llewellyn, Trzaskowski, Plomin, and Wardle (2013) identified about 32 genes that predispose individuals to risk factors of obesity, and only an estimated 2% of these genes are responsible for individual differences in children's body weight. Researchers also concluded that, through genomewide complex trait analysis (GCTA), different genetic make-up results occurred in about 30% variances in the body weight of a child (Llewellyn et al., 2013). The findings of this study support the claim that children's genes play a crucial role in regulating body weight and childhood obesity, and children whose parents are obese are predisposed to obesity (Llewellyn et al., 2013).

The measurement of obesity is normally carried out with the use of the BMI, which is calculated using the formula BMI = kg/m^2. As a method of measuring obesity, most researchers choose BMI because of its accuracy and reliability. Because it is hard to measure body fat directly, BMI is used to categorize individuals' weight as either underweight, normal weight, overweight, or obese (Pasco et al., 2014). Regarding children, BMI is categorized based on age and gender because of the different physiological changes that occur during growth and development. According to Flegal and Ogden (2011), a child who weighs between the 85th and 94th percentile is overweight, whereas a child whose BMI is at or above the 95th percentile is considered obese. The task of determining the appropriate weight for a child to live a healthy lifestyle is complex. However, BMI is normally used as a screening tool because a higher BMI indicates an increased risk of a child's becoming overweight and developing obesity if no preventative measures are taken.

Health Concerns Related to Childhood Overweight and Obesity

The chronic health effects of obesity can have both immediate and long-term consequences, which can significantly impact the lives of the individuals and society as a whole. These potential negative outcomes of childhood obesity demand a call for action by public health officials, policymakers, and the various governmental levels (Tirosh et al., 2011). Due to its long-term social, economic, and health-related impacts, childhood obesity is a major public health problem in the United States (Hamid et al., 2013).

Additionally, the increasing number of comorbidities that are linked to obesity has made childhood obesity a major problem among America's children (Glavin et al., 2014).

While obesity is easy to recognize in children, its treatment is relatively difficult (Hamid et al., 2013). Consequently, there is an increase of comorbidities related to obesity among children (Flynn, 2013). Examples of obesity-related comorbidities include prediabetes, Type II diabetes, cardiovascular diseases (CVD) such as high blood pressure (hypertension), high cholesterol levels, sleep apnea, insulin resistance, atherosclerosis, depression, asthma, joint-related problems, and even death (CDC, 2014c; Han et al., 2010; Office of the Surgeon General, 2010; Reifsnider, Hargraves, Williams, & Cooks, 2010; Spruijt-Metz, 2011). Childhood obesity has also been linked to physical, psychological, and social problems such as stigmatization, bullying, truancy, inadequacy in academic performance, and low self-esteem (CDC, 2014c). A considerable amount of evidence exists documenting the health risks, including increased risk for developing atherosclerotic impairment resulting in organ damage, and possible fatality (Han et al., 2010; Office of the Surgeon General, 2010).

The environment in which children live determines their diet and physical activity behaviors (Carroll-Scott et al., 2015). Researchers have identified the environment as one of the main factors that influence children's sedentary and physical activity behaviors (Maitland et al., 2013). Unlike adults, children's physical activity behaviors are greatly influenced by their parents and the immediate home environment (Larson, Whiting, & Green, 2013). With the increasing rates of childhood obesity in the United States, there is an increasing need to understand the neighborhood-level factors that influence childhood obesity in order to address all the risk factors of childhood obesity and ensure effective control and management of the condition.

Neighborhood-Level Factors of Childhood Obesity

Childhood obesity has been attributed to lack of healthy foods, decreased physical activity, neighborhood insecurity, and low socioeconomic status (SES; Auchincloss et al., 2013). These neighborhood-level factors are interrelated, and they interact to influence children's health behaviors, thus increasing their risk of obesity (Boone-Heinonen et al., 2013). Furthermore, neighborhood SES and neighborhood safety are interrelated in that high-income neighborhoods are more likely to be well-protected with developed security plans, compared to low-income neighborhoods (Auchincloss et al., 2013). As a result, children in high-income neighborhoods are more likely to be allowed to take part in physical activities, compared to children from low-income neighborhoods that are relatively insecure (Boone-Heinonen et al., 2013).

Built environments have also been found to influence children's risk of developing obesity (Williams, 2011). The neighborhood built environment, which includes roads, buildings, sidewalks, and open spaces, can either promote or discourage physical activity behaviors among children (Tappe, Glanz, Sallis, Zhou, & Saelens, 2013). Safe neighborhoods can promote positive health behaviors because parents feel that it is safe to allow children to play at the neighborhood playground, ride their bikes, or walk to and from school, thus increasing participation in physical activities and decreasing risks of childhood obesity (Sallis et al., 2012). By contrast, unsafe neighborhoods with high crime rates and limited space for recreation promote sedentary lifestyles among children and thus increase the risk of obesity (Sallis et al., 2012). Parks

and recreational facilities provide opportunities for children to participate in physical activity behaviors, thereby reducing the likelihood of childhood obesity.

The purpose of this study was to close the gap in the professional literature regarding the association between neighborhood-level factors and the risk of childhood obesity. Understanding the neighborhood-level factors that are linked to childhood obesity and overweight may assist in the development of early, effective, and comprehensive obesity prevention interventions to help address the increasing prevalence of obesity and overweight in the United States. In addition, assessment of the neighborhood-level factors that influence childhood obesity can facilitate the introduction of structural and social changes in society, thus improving the relationship between individuals in the neighborhood (Hall et al., 2011).

Problem Statement

The problem researched in this study was that over 23 million children and adolescents in the United States are either overweight or obese (Spradlin, Gard, Huang, Kopp, & Malik, 2012). In the past 30 years, obesity has developed into one of the most challenging illnesses in the United States (Spradlin et al., 2012). During this period, the prevalence of obesity has tripled among children, aged 6-11 years and doubled among children, aged 2-5 years (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Between 2009 and 2010, approximately 18% of children, aged 6-11 years, were overweight, and 12.1% of those aged 2-5 years were obese (Ogden, Carroll, Kit, & Flegal, 2012).

According to Saelens et al. (2012), the prevalence of obesity was high among minority children from families with low incomes. Low-income and African-American

neighborhoods are commonly associated with unhealthy foods, which have the potential for increased rates of obesity among children and adolescents (Carroll-Scott et al., 2015). In California, the estimated number of overweight children, aged 2-5 years, was 16%, and obesity for that population was approximately 17.2% (CDC, 2014a). Obesity has been associated with adverse health outcomes among children that could lead to high mortality rates and a decrease in their quality of life (Spradlin et al., 2012). There is increasing evidence supporting the role of the environment in behaviors that may predispose children to obesity (Carroll-Scott et al., 2015). Of the various exposures and behaviors linked to the significant rise in obesity, the increasingly sedentary lifestyle among Americans has been found in numerous studies to be a contributing factor (Ogden et al. 2010). The lifestyle shift among Americans is attributed to changes in neighborhood environments, which do not offer many opportunities to engage in healthy living. Low-income and African-American neighborhoods are commonly associated with unhealthy foods that also have the potential for increased rates of obesity among children and adolescents (Carroll-Scott et al., 2015).

Research regarding the relationship between low income environments, neighborhood safety, and physical activity behavior is limited (Saelens et al., 2012). According to Boone-Heinonen et al. (2013), characteristics of the neighborhood food environment, especially the availability of vegetables and fruits, significantly improved dietary intake among children and adolescents, thereby decreasing the risk of obesity.

Neighborhood safety has been investigated by some researchers to determine its influence on physical activity and obesity in both adults and children. According to

Kimbro, Brooks-Gunn, and McLanahan (2011), low levels of neighborhood safety have been linked to reducing physical activity levels, thus increasing the risk of obesity among children and adolescents. Another neighborhood aspect that influences obesity is walkability. Kimbro et al. (2011) argued that individuals who lived in more walkable neighborhoods had a reduced likelihood of developing obesity.

The goal of the present study was to assess the impact of neighborhood-level predictors on the obesity epidemic among African-American youths and, by heightening public health awareness, help to establish strategies for reducing the progression of obesity into adulthood. Furthermore, instituting needed changes in children's environments may be another necessary and effective strategy to reduce the obesity epidemic among minority children. Saelens et al. (2012) identified the prevalence of obesity as high among minority children and in families with low income. There is a noticeable gap in the current literature regarding the study of neighborhood-level predictors or environmental influences on childhood obesity. A gap also exists in the current research regarding the relationship between low income environments, neighborhood safety, and physical activity behavior, which are key determinants of obesity among children (Saelens et al., 2012).

Purpose of the Study

The main purpose of this quantitative study was to explore the relationship between neighborhood-level predictors and obesity among African-American children, aged 5-11 years and living in California. The eight variables tested were: (a) BMI; (b) neighborhood safety; (c) neighborhood support; (d) presence of parks, playgrounds, or

open spaces; (e) physical activity levels; (f) parents' educational level; (g) neighborhood built environments; and (h) neighborhood walkability. This study was aimed at closing a gap in the current research regarding the association between environmental factors and childhood obesity. In order to achieve this purpose, I evaluated the association between childhood obesity and socioecologic factors in the children's environment.

Research Questions and Hypotheses

- RQ1: What is the association between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
    - *Null Hypothesis (H_0)*: After adjusting for all variables, there will be no association between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California.
    - *Alternative Hypothesis (Ha)*: After adjusting for all other variables, a statistically significant association exists between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California.
- RQ2: What is the association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
    - *Ho2*: After adjusting for all other variables, there will be no association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California.

- *Ha2*: After adjusting for all other variables, a statistically significant association exists between neighborhood support and BMI among African-American children, aged 5-11 years, living in California.

- RQ3: What is the association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
  - *Ho3*: After adjusting for all other variables, there will be no association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 year, living in California.
  - *Ha3*: After adjusting for all other variables, a statistically significant association exists between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 year, living in California.

Theoretical and Conceptual Framework for the Study

The proposed study employed the sociocological model (SEM) as the guiding theoretical framework. Based on the SEM, the health of an individual is determined by different influences and their interactions. The SEM provided a framework for improving the understanding of various factors and barriers that affect health behaviors and outcomes (Townsend & Foster, 2013). The SEM focuses on key political and environmental variables that guide the individual and his or her interpersonal characteristics (Townsend & Foster, 2013). Daily exposure of children to neighborhood-level characteristics was expected to elicit unique responses among the children. The

SEM provided a framework with which to explain the complex associations between the various exposures to which children are subjected and their impact on the development of obesity (Williams, 2011). Assessing the effects of neighborhood factors on children's health behaviors could facilitate the development of lasting interventions to reduce the impact of *obesogenic* environments on children (Williams, 2011).

The SEM was developed by Bronfenbrenner (1979) who illustrated the relationships of health behaviors and outcomes in multiple spheres of factors such as public policy, intrapersonal and interpersonal factors, schools, and communities (Williams, 2011). I used the SEM to assess the impact of a child's neighborhood environmental influences on childhood obesity. The intrapersonal level involves an individual's behaviors and health beliefs and is the most personal level of the SEM (Townsend & Foster, 2013). The interpersonal level involves the children's interactions with friends, neighbors, and family members that may influence their physical activity behaviors (Bronfenbrenner, 1994). The community level involves exposure of children to obesity risk factors that exist in their social environment, including schools, churches, workplaces, and neighborhoods (Williams et al., 2014). At the community level, I assessed the relationship between neighborhood-level factors and childhood obesity. The final level of the SEM is the policy level, which involves the adoption of formal legal actions by states, local governments, and the federal government for the purpose of changing children's health behaviors.

The problem of overweight or obesity is multifactorial. One of the primary factors found to be associated with childhood obesity is the environment in which the child

resides (Auchincloss et al., 2013). To gain a comprehensive understanding of childhood overweight and obesity, it is important to study children's eating habits, physical activity behaviors, and the environmental influences that affect their weight status and nutrition behaviors. Different from adults, children cannot control what they eat, where they live, play, or learn (Swinburn et al., 2011). Obesity is a public health problem, and controlling and preventing it requires that people make lifetime adjustments toward eating healthy and increasing their physical activity behaviors. Therefore, for effective control of obesity among children, parents and communities need to ensure that children have healthy eating habits and safe environments that promote participation in physical activity.

Nature of the Study

This study was quantitative in nature and relied on hypothesis testing to answer the research questions. First, it was hypothesized that, after adjusting for all other variables, there would be no association between neighborhood safety and BMI among Africa-American children, aged 5-11 year, living in California. The second hypothesis posited that, after adjusting for all other variables, there would be no association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California. The third null hypothesis stated that, after adjusting for all other variables, there would be no association between neighborhood park/playground/open-space safety and BMI among Africa-American children, aged 5-11 years, in California. Other hypotheses that I tested included the association between parents' educational

level, neighborhood built environments, food insecurity, and the risk of obesity among African-American children, aged 5-11 years, living in California

This project was based on the SEM, developed by Bronfenbrenner in 1979, which is based on the concept that individuals' physical activity behaviors are influenced by predisposing, enabling, reinforcing, and sociodemographic factors in their immediate environment. Based on the SEM, the elimination of barriers to physical activity in the neighborhood provides opportunities for participation in outdoor physical activity that could lead to an increase in energy expenditure, thereby reducing the risk of childhood obesity (Williams, 2011).

This quantitative study was conducted with secondary data from the 2009-2014 California Health Interview Survey (CHIS) to assess the relationship between neighborhood-level characteristics and childhood obesity. The dependent variable was the BMI, and the independent variables were neighborhood safety, neighborhood support, and neighborhood park/playground/open-space safety. I used a quantitative cross-sectional research design, multivariate logistic regression, and chi-square tests to assess the association between neighborhood-level factors and childhood obesity. Chi-square tests were also conducted to assess the environmental factors that influenced physical activity and BMI among children. I performed statistical analyses with the use of SPSS software at the 0.05 level of significance.

Definition of Terms

Bariatric surgery: Bariatric surgery is a surgical reconstruction of the digestive system to assist in weight loss. Gastric bypass surgeons attach the small intestine to the

stomach, thereby making the person feel full quicker with little to eat and drink (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2016).

Body mass index (BMI): The BMI is a key measure used to define an individual's weight in kilograms in relation to his or her height in meters (Pasco et al., 2014).

Childhood obesity: Childhood obesity is a health condition that affects children and adolescents. Childhood obesity occurs when children weigh above the normal weight for their age and height. Obesity is denoted by BMI for age and gender that is over or at the 95th percentile, while overweight is denoted by BMI for age and gender that is above or at the 85th percentile (Güngör, 2014).

Food insecurity: According to Elliott and Beeland (2015), food insecurity refers to the lack of or inadequate access to affordable, safe, and nutritious foods.

Health behavior: Health behaviors involve the activities that an individual undertakes to regain, maintain, or prevent optimal health (Mackenbach et al., 2014).

Healthy food environment: According to the Osei-Assibey et al. (2012), food environment refers to the availability of foods that influence an individual's diet in the environment.

Neighborhood safety: Neighborhood safety refers to the physical security and frequent occurrences that may influence an individual's physical activity behaviors (Saelens et al., 2012).

Neighborhood support: Neighborhood support is described as a community with increased social support and trust that encourages parents or guardians to allow their children to play outside the house (Borrel, Graham, & Joseph, 2016).

Neighborhood walkability: Neighborhood walkability refers to the safety and qualities that are present in a particular environment that make walking a positive experience (Talen & Koschinsky, 2013).

Neighborhood-level factors: Neighborhood-level factors are variables within the individuals' immediate environment that may predispose them to higher risks of developing specific diseases (Farr, Marx, Weiss, & Nash, 2013).

Obesogenic factors: Obesogenic factors are environmental factors that encourage high calorie intake and low energy expenditure, thus increasing the risk of obesity or overweight (Mackenbach et al., 2014).

Overweight: BMI of between 85% to ≤95 percentile, adjusted for age and gender that are calculated based on a child's height and weight and plotted on a continuous scale to determine weight status (CDC, 2011a).

Physical activity: According to the CDC, physical activity refers to the bodily movements that result from contraction of skeletal muscles in the human body, which leads to increased energy expenditure above a basal level (Hills, Andersen, & Byrne, 2011).

Assumptions

Several assumptions were made in this study. First, it was assumed that the CHIS would contain the correct measurements of the children's BMI. It was also assumed that children and parents reported the correct gender, race, and SES, regardless of the individual behaviors. Another assumption was that the respondents provided unbiased responses in the CHIS survey. A further assumption in this study was that increased

understanding of the neighborhood-level factors' association with childhood obesity would facilitate the development of effective, evidence-based interventions to assist in the management of obesity in practice, when the findings of this study would be disseminated to stakeholders and provided to the public as a guide in the control of childhood obesity.

Scope and Delimitations

This study was focused on increased understanding of the impact exerted by neighborhood-level factors on childhood obesity among African-American children in California. The project was aimed at assessing the influence of variables such as neighborhood safety, neighborhood support, neighborhood park/playground/open-space safety, walkability, and sociodemographic characteristics on the risk of obesity and overweight among African-American children, aged 5-11 years. In addition, this study was aimed at closing a gap in literature regarding the relationship between neighborhood-level factors and childhood obesity.

This study was intended for parents and health care providers to gain a better understanding of the factors within the children's immediate surroundings that may predispose them to develop obesity. Through this study, health care providers are better able to develop effective obesity-prevention interventions guided by the SEM. As a result, health care providers would be able to promote healthy behaviors among children, as recommended by organizations such as the American Academy of Pediatrics. Because I used a large sample size, the findings of this study are generalizable to all children, aged 5-11 years, living in California.

Limitations

This study has several limitations. First, I used secondary data for 6 years (2009-2014) from the CHIS 2009, 2011-2012, and 2013-2014 data sets. The data were obtained from the Data Access Center (DAC) by presenting a letter as evidence of faculty sponsorship. While the use of secondary data is less expensive and less time-consuming than the collections of primary data, there is a higher likelihood of bias because the data were not originally intended for the study in which they are now being used (Johnston, 2014). In addition, incomplete data may result in unreliable results (Johnston, 2014). Also, the school and neighborhood measures used in this study were based on self-report data and collected for the CHIS data sets 2009-2014. Therefore, the reliability of the findings of this study could be inhibited.

Significance

This study was aimed at assessing the association between neighborhood-level factors and obesity among children living in California. The rate of childhood obesity is increasing in the United States and worldwide (Ogden et al., 2014). To develop evidence-based interventions that can effectively control the rate of childhood obesity, there was a need to assess the association between neighborhood-level factors that influence the children's diet and physical activity behaviors (CDC, 2014b). Using evidence-based strategies to evaluate childhood obesity could lead to the establishment of interventions that could positively impact some communities and improve public health.

This study was focused on children, aged 5-11 years, and was based on the SEM as the theoretical foundation. Early control and prevention of obesity is vital because the

majority of obese patients have been found to develop comorbid conditions well into adulthood (Flynn, 2013). Therefore, this study provided an overview of the association between different neighborhood-level factors and obesity among African-American children who are between the ages of 5 and 11 years and live in California. Also, this study is contributing to the growing literature on childhood obesity and can provide guidance to future researchers regarding environmental influences that predispose children to obesity.

Summary

Childhood obesity is a major problem that is affecting children in the United States. Poor health behaviors among children could have significant long-term consequences on their health and well-being (CDC, 2014a; Flynn, 2013; Glavin et al., 2014; Hamid et al., 2013; Reifsnider et al., 2010; Spruijt-Metz, 2011). Children in various age groups are affected by a wide range of external factors that may alter their health behaviors. Because of their young age, children are greatly affected by factors in their neighborhood, including parents, peers, schools, and the community (Kimbro et al., 2011). Therefore, children's health and lifestyle behaviors are mainly shaped by the constant exposure to predisposing, enabling, and reinforcing factors in their environment (Flynn, 2013).

Although many programs have been developed to reduce childhood overweight and obesity, only a few have addressed the impact of the children's environment on their weight status (Flynn, 2013). The purpose of this study was to improve the understanding of the impact of neighborhood-level factors on the risk of childhood obesity. According

to Glavin et al. (2014), the development of obesity in children results from the interactions between multiple environmental factors to which the child is exposed during the growing years. Therefore, understanding the relationship between childhood overweight and obesity and these neighborhood-level factors, using an ecological approach, may facilitate the development of effective obesity-prevention programs to control the disease (Glavin et al., 2014; Spruijt-Metz, 2011). Although the rate of obesity seems to have plateaued over the past few decades, the prevalence of childhood obesity in the United States is still alarming (Ogden et al., 2014). Childhood obesity is accompanied by life-threatening comorbidities such as stroke, hypertension, cancer, and Type II diabetes, which may increase the rate of mortality among obese and overweight individuals. In addition to the threat posed to the children's health, childhood obesity also leads to increased costs of health care.

In the next chapter, I present a comprehensive review of the literature on the association between neighborhood-level factors and childhood obesity in the United States. In addition, I provide a discussion of the conceptual framework, the rationale for choosing the SEM, and an appraisal of studies related to the key variables I examined in this study.

Chapter 2: Literature Review

Introduction

The increasing prevalence of obesity has attracted much attention over the past few decades as a major public health problem. Cases of childhood obesity have been on the rise progressively since the 1980s (Ogden et al., 2012). According to surveys from the Centers for Disease Control and Prevention (CDC), the number of overweight children has doubled over the past few years in the United States (Ogden et al., 2012). Significant differences exist between school-age children who are obese by race/ethnicity and also by gender, with more decreasing rates among girls than boys (CDC, 2012b).

Between 2009 and 2010, obesity rates among non-Hispanic boys, 2-19 years of age, was 17.5%; among non-Hispanic Black boys, it was 22.6%; and among Mexican-American boys it was 28.9% (Ogden et al., 2012). Among girls in the corresponding groups, obesity rates were recorded as 29.2% for non-Hispanic Whites, 36.1% for non-Hispanic Blacks, and 37% for Hispanics (Ogden et al., 2014). Overall findings indicated that African-American girls had higher obesity rates than boys of the same age group and girls from other ethnicities (Fryar, Carroll, & Ogden, 2012). The existing literature indicated that children from low-income populations, especially among African Americans and Latinos, have a higher likelihood of developing obesity, compared to White children. For instance, Ogden, Carroll, Kit, and Flegal (2014) found that children from low-income neighborhoods were approximately twice as likely to develop obesity than children from areas with a higher SES. Obesity among children and adolescents is a major health challenge in the United States and in other developed countries as well.

There is a higher prevalence of obesity among African-American and Hispanic children, compared to White children in the United States (Ogden et al., 2012). Childhood overweight and obesity have been associated within children's built environment, which includes accessibility to healthy foods, safe neighborhoods, places to exercise, and man-made structures (Sallis et al., 2012). The U.S. government has demonstrated its determination for the prevention of childhood obesity through initiatives such as the Hunger-Free Kids Act of 2010, Healthy Eating, and the Active Living—Community Health Initiative, among others (Karnik & Kanekar, 2014). There is a rising need for research that analyzes the impact of environmental factors on the rate of obesity among children (Abraham, Kazman, Zeno, & Deuster, 2013). Additionally, there is a need to assess the association between childhood obesity and various environmental factors and how the development of effective interventions could assist in reducing or preventing childhood obesity.

The main purpose of this study was to assess the impact of neighborhood-level factors on childhood obesity among African-American children in California. To achieve this purpose, I examined the specific impact of neighborhood-level factors on African-American children, aged 5-11 years, such as neighborhood safety; neighborhood support; presence of parks, playground, or open spaces; physical activity; parents' educational level; neighborhood built environments; and neighborhood walkability. This study was aimed at closing a gap in the current literature by studying the impact of neighborhood-level predictors on childhood obesity.

In this chapter, I provide a comprehensive review of relevant literature, related to the impact of neighborhood-level factors on childhood obesity and the theoretical foundations of this study. This review provides a background of the problem and an introduction to the purpose of this study. I also discuss the literature search strategy and key words used to locate relevant articles. I explain the theoretical foundation for the study, which was based on Bronfenbrenner's (1979) theory of the ecology of human development. The chapter contains an in-depth review of environmental factors that affect childhood obesity and concludes with a summary and conclusion based on the literature review. The chapter is organized into seven sections: an introduction, literature search strategy, theoretical foundation, rationale for choosing the ecological method (SEM), conceptual framework, literature review related to key variables and concepts, and a summary and conclusions.

Literature Search Strategy

Childhood overweight and obesity are a major health problem in the United States. The scope of this literature review encompassed neighborhood-level factors that appeared to influence childhood obesity. This review also covered the role of environmental disparities in the development and growth of young children. To develop this section, I accessed various online databases, trusted professional websites of peer-reviewed journal articles, and organizations such as Public Health Association, World Health Organization (WHO), and Centers for Disease Control and Prevention (CDC). The literature search involved other online databases as well such as JSTOR, CINAHL, EBSCOhost, ProQuest, Science, PubMed, Wiley Interscience Journals, Academic Search,

Science Direct, and Google Scholar. Key search terms used were *childhood obesity, neighborhood-level factors and childhood obesity, socioecological model, neighborhood safety, neighborhood support, food insecurity, parent's education level, BMI, built, environment, childhood obesity and physical activity, fast-food restaurants and obesity,* and *neighborhood walkability*.

I examined the titles and abstracts of the journal articles to ensure that they were relevant and met the inclusion criteria. I downloaded all the articles that met the inclusion criteria and stored them in my personal database. I manually searched additional articles in the reference sections of previously retrieved articles. I gathered and reported all the findings after eliminating articles that did not further the purpose of this study. This review included only English-language articles that were published since 2011. The exclusion criteria helped to avoid articles that were not published in English, narrative reviews, studies that lacked a defined sampling procedure, and papers that were published before 2011. Additionally, studies that focused mainly on the elderly or on socioeconomic features of neighborhoods were excluded.

The search procedure included an examination of abstracts and titles of the journal articles for relevance to the research purpose of this study and consistency with the inclusion criteria. For all relevant articles, I retrieved the full text and stored it in my personal database. Figure 1 shows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram for this project.

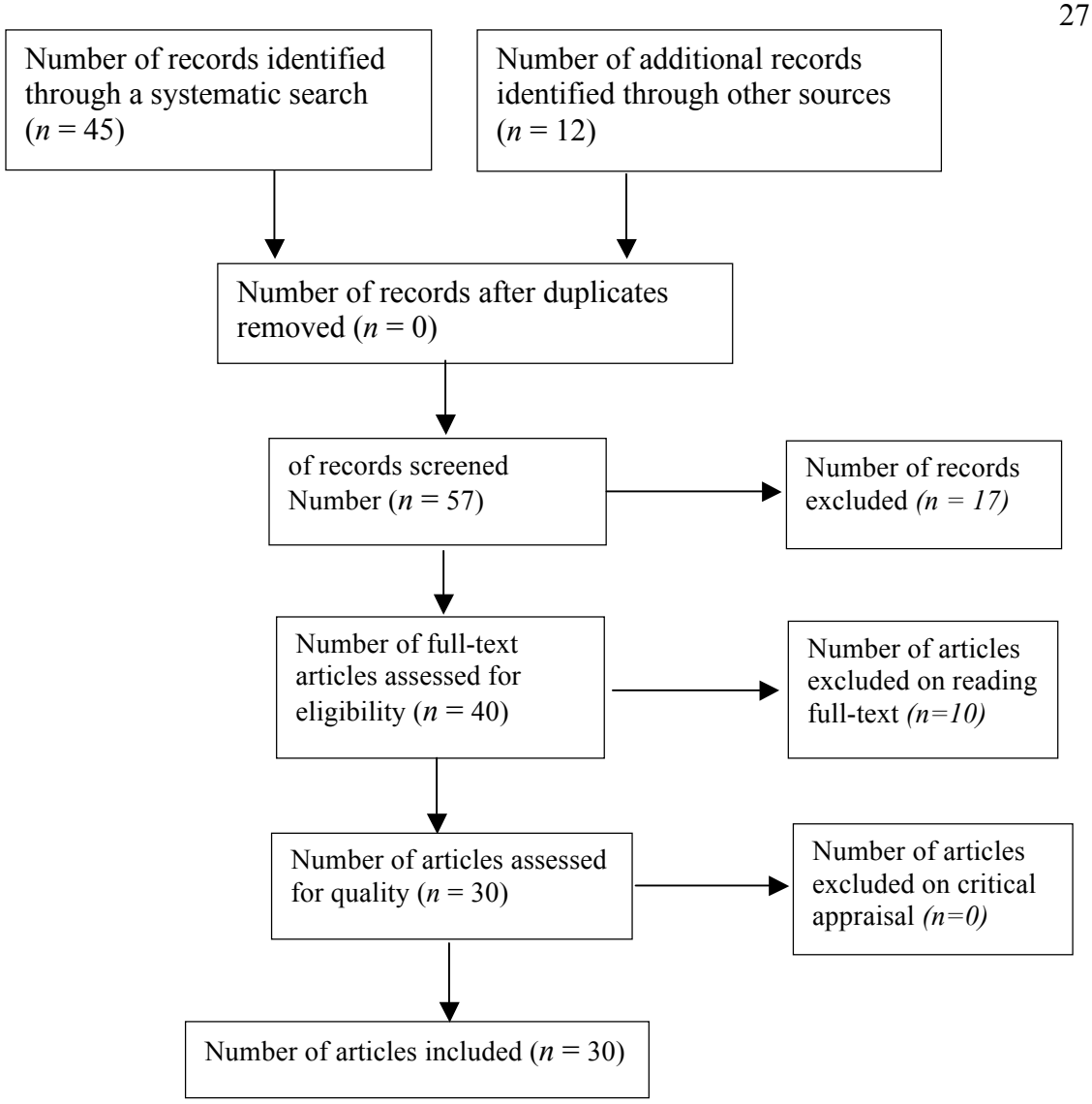


Figure 1. PRISMA diagram showing the selection of 30 relevant articles.

Theoretical Foundations and Conceptual Framework

The majority of models and theories for change in the public health domain are focused on culture, behavior change, and the environment. A multilevel model that consists of the incorporation of various theories and models is usually used when one studies a health problem. However, the choice of a theory or model when designing a

program is dependent on other factors as well, including the amount of available resources, goals, and preferences (McLeroy, Bibeau, Steckler, & Glanz, 1988). For the purposes of this study, I chose the SEM by Bronfenbrenner (1994).

The research questions posed for the study focused on the association between neighborhood-level factors and childhood obesity among African-American children. Bronfenbrenner (1994) argued that the examination of human development requires a comprehensive study of the interrelationships between humankind and the surrounding environment. In the context of childhood obesity, the most important factor appears to be the parent who spends most of the time with the child and also acts as a source of emotional support and provider of nutrition and nutritional knowledge (Gunnarsdottir, Njardvik, Olafsdottir, Craighead, & Bjarnason, 2011). Other settings that play an important role in a child's development include churches, neighborhoods, hospitals, schools, and community parks. Development and growth in children occur through complex processes that happen in interfaces between the child and the surrounding environment. However, interfaces can only be successful when there are intercommunications between the children and the environment over a prolonged period.

Additionally, successful interfacing necessitates a focus on the child as the center of the model and recognition that children contribute to their own health behaviors. Bronfenbrenner (1989) argued that a child's biological composition acts as a microenvironment that determines development. As children develop, their interactions with the environment become complex and result in specific health outcomes (Bronfenbrenner, 1989). Additionally, the quality of the influences between the child and

his or her immediate surroundings could impact the type of food consumption, physical activity level, and the child's body weight.

The socioecological theory was used to guide the research questions of this study as well as the explanation of the findings. In public health, the SEM provides a foundation for understanding health problems and developing interventions. The SEM was selected for this research because it facilitated the incorporation of both behavior change and environmental improvement interventions based on existing theoretical frameworks. As Bronfenbrenner (1994) argued, the SEM recognizes mutual causation between the individual and his or her environment and is aimed at describing the nature of people's interaction with their immediate physical and socioecological surroundings.

The theoretical basis of the SEM is traced to Bronfenbrenner (1994), who described various interactions between the five systems that affect an individual's behaviors and development: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. The microsystem includes the interpersonal relationships between individuals together with their social roles in a particular setting (Bronfenbrenner, 1994). The mesosystem involves the associations and the process of development of a person in two or more settings. The exosystem is concerned with the connections and processes of a person in two or more settings, where one setting may influence the individuals' immediate development. The macrosystem accommodates the microsystem, exosystem, and the mesosystem. The chronosystem is the last system in Bronfenbrenner's model. The chronosystem puts into consideration any environmental, natural, and sociohistorical events that happen in a person's life (Bronfenbrenner, 1994, 1989). Environmental and

natural events are such occurrences that happen when a person is developing and continue throughout a person's lifetime; they include small changes or major events over the lifetime such as a death in the family or divorce. Sociohistorical circumstances include changes that occur due to the aging process of a person. These events tend to influence how a child interacts with the environment. Other changes that may influence childhood obesity at this level are ethnicity, age, and cultural beliefs and practices. The family has the ability to act on the various stressors within society that are present in every individual's life. The conceptual framework of the SEM is depicted in Figure 2.

Various theories on behavioral change and health promotion have been advanced in the past 3 decades, based on Bronfenbrenner's (1979) approach to human development. However, the most common SEM in health promotion was McLeroy and his colleagues' model, which they developed in 1988. The main aim of McLeroy, Bibeau, Steckler, and Glanz's (1988) model was to combine the principal theories on individual behaviors and lifestyle choices within the organizational and social context. McLeroy et al. proposed a health promotion ecological model using Bronfenbrenner's SEM and incorporating ideas from several other researchers. The central concept of McLeroy et al. ecological model was the notion that behavioral change can be achieved only if the political, community, organizational, interpersonal, and intrapersonal influences on human behavior are leveraged. Collectively, these influences can be employed in the development of comprehensive strategies for addressing problems with human behavior and promoting people's health.

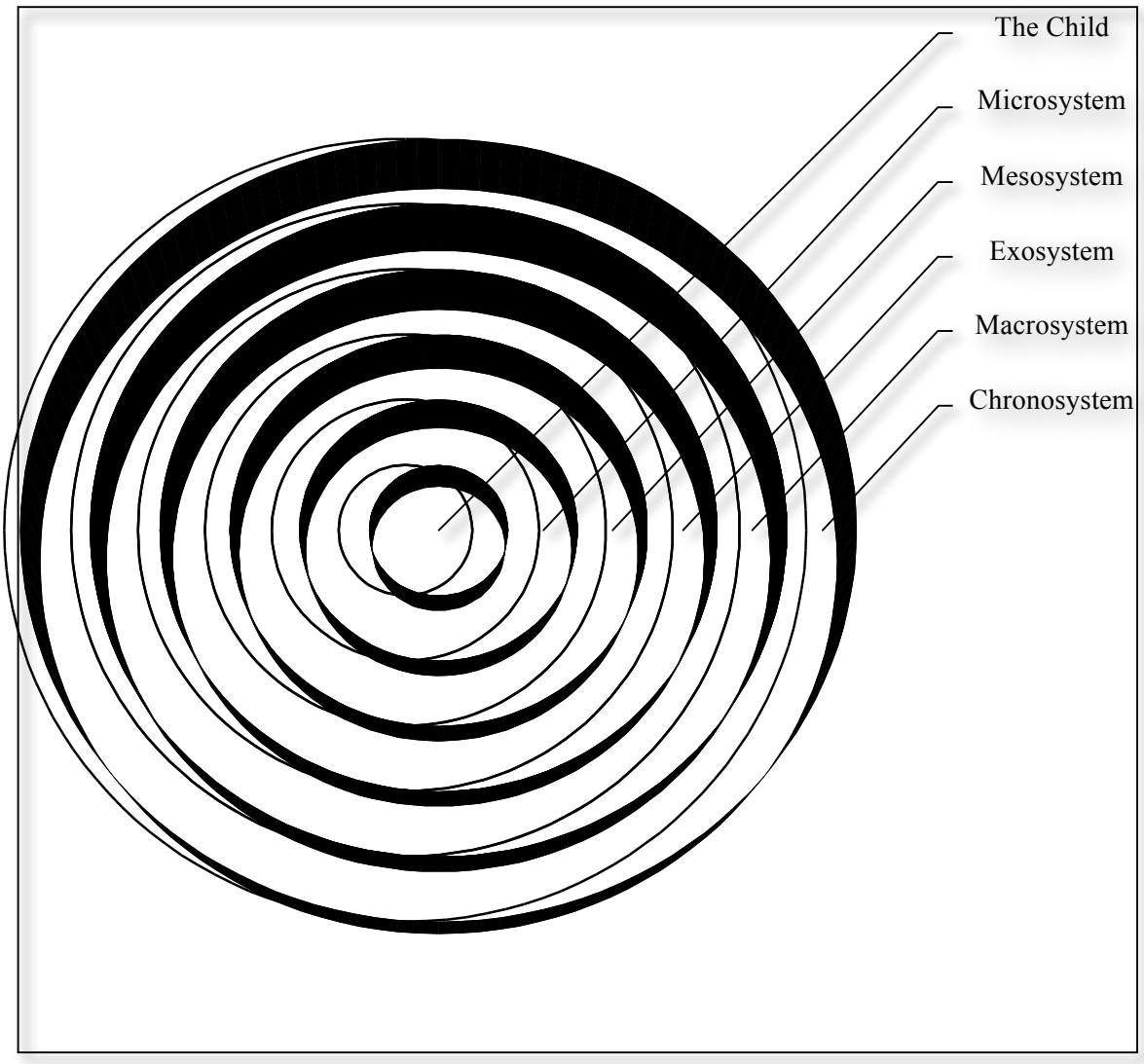


Figure 2. Conceptual framework of the SEM

McLeroy et al. (1988) argued that intrapersonal influences are the attributes of an individual, including attitudes, knowledge, and practices, while interpersonal influences comprise the individual's interactions with social networks and family. According to McLeroy et al., organizational influences include social institutions that have well-defined structures and operational protocols. Based on the McLeroy et al. model, community influences comprise networks, the physical environment, and entities that

may affect behavioral change. Lastly, policy influences include the national, state, and local laws and policies that may have an impact on individuals' physical activity behavior.

Stokols (1992) also developed a conceptual model for health-promoting environments in the 1990s, using Bronfenbrenner's (1979) SEM. Stokols (1992) focused his design on describing the relationship between the environment and related health problems among individuals. According to Stokols, health promotion is a broad and dynamic interaction between people and other groups in the environment. Stokols held that the existence of different types of environments with varying societal dimensions leads to unique influences on health outcomes. Therefore, differentiating between health outcomes based on duration, severity, and significance to the community is vital.

Richard, Potvin, Kishchuk, Prlic, and Green (1996) also provided valuable ideas on the operationalization of the SEM for purposes and use in practical health promotion programs. The initiative was based on Stokols's (1992) concept of health-promoting environments and incorporated McLeroy et al.'s (1988) main targets for human behavioral change. Additionally, Richard et al. (1996) used Miller's (1978) theory of living systems, which described the different interactions between individuals and their environment. Using Miller's theory, Richard et al. (1996) identified four types of settings that can support public health interventions: organizational, community, societal, and supranational settings. Organizational settings include institutions such as schools and businesses; community settings comprise neighborhoods and parent associations; societal

settings include states, provinces, and districts; and supranational settings comprise unions such as the European Union (EU; Townsend & Foster, 2013).

Richard et al. (1996) theorized the health promotion intervention as the association that links the targets prioritized for change with the health-promotion strategy. Based on Richard et al.'s model, various targets within a given health-promotion strategy can be linked through a transformational or networking relationship. The major targets of an intervention are the individuals who can be accessed proximally by health promoters or other health care providers. According to Richard et al., the term *networking relationship* refers to situation where the health promoters create new relationships between different individuals for the purpose of reaching the ultimate target. Network relationships can arise in the form of community coalitions, advocacy groups, interagency agreements, and informal cooperatives. Networking and transformational relationships can be formed in various combinations and can involve achieving success with smaller targets before, finally, accomplishing success with the ultimate target (Waters, Swinburn, Seidell, & Uauy, 2011). The SEM's development in the 1990s highlighted the importance of the environment as a source of support for people and its contributions to the promotion of human health. Therefore, the use of a comprehensive SEM that incorporates both the individual and environmental influences is important in understanding the association between overweight and obesity and environmental predictors, which include neighborhood insecurity, lack of access to recreational parks, unsafe communities, insufficient supermarket stores, unhealthy eating, and a sedentary lifestyle. The application of a health-behavior theory at every level of influence assists in

planning and implementing the health-promotion interventions through the incorporation of theoretical concepts to individuals' actions for the purpose of attaining desired outcomes (McLeroy et al., 1988). The existing literature supported the use of social cognitive theory in the prevention of obesity among children because it influences behavioral change on an interpersonal level. In this section, I provided an in-depth discussion of each level of influence and the theories that correspond to these levels.

Rationale for Choosing the Socioecological Method (SEM)

Childhood obesity is associated with multiple factors, including the child's family and the surrounding environment. The SEM describes how the different levels of exposure, including the surrounding environments, influence children's health behaviors, thus affecting their weight status. For a better comprehension of the multifaceted nature of childhood obesity, it is important to first assess the parental influence on children's health behaviors (Moore, de Silva-Sanigorski, & Moore, 2013). The SEM states that a comprehensive understanding of individuals' health requires a thorough examination of their ecological environment, which includes their families, cultural preferences, school, and the surrounding community (Moore et al., 2013). Based on the SEM, these distinctive factors are ordered into five layers: microsystems, mesosystem, exosystem, macrosystem, and chronosystem. These layers continuously interact to create complexity in the environment that causes obesity (Waters et al., 2011). Various risk factors such as poor diet, physical inactivity, and environmental factors influence childhood obesity and weight status. For example, Gunnarsdottir, Njardvik, Olafsdottir, Craighead, and

Bjarnason (2011) found that families could play significant roles in determining a child's weight status because children follow their parents' nutritional knowledge and behaviors.

The SEM focuses on the significance of various complex constructs in the environment in which children develop. The SEM also provides a broad framework for the examination of neighborhood-level factors on childhood obesity at all levels of influence. The research questions posed for this study were focused on the association between neighborhood-level factors and childhood obesity among African-American children. Additionally, I aimed at examining the disparity of obesity among children in high-risk areas based on race. Bronfenbrenner (1994) argued that the examination of human development requires a comprehensive study of the interrelationships between humankind and the surrounding environments.

In the context of childhood obesity, the most important factor is the parent who spends most of the time with the child and also acts as a source of emotional support and nutritional knowledge (Gunnarsdottir et al., 2011). Other settings that play a significant role in a child's development include churches, neighborhoods, hospitals, schools, and community parks. Development and growth in children occur through complex processes that happen in interfaces between the child and the surrounding environment. However, interfaces can only be successful when there are intercommunications between the children and the environment over a prolonged period. Additionally, successful interfaces also necessitate a focus on the child as the center of the model and recognition that children contribute to their own health behaviors.

Bronfenbrenner (1989) argued that a child's biological composition acts as a microenvironment that determines development. As children develop, their interaction with the environment becomes complex and results in specific health outcomes. Additionally, the quality of the influences between the child and the immediate surroundings could impact the types of food consumption, physical activity level, and body weight. Based on the SEM, childhood obesity is associated with various risk factors at the intrapersonal, policy, institutional, and community levels.

The theoretical concepts in this study were based on the SEM and provided the framework for the collection of data relating to the association between neighborhood-level factors and obesity among African-American children. According to Bronfenbrenner (1994), influences on health behaviors can be categorized into levels or layers: the intrapersonal, interpersonal, institutional, community, and public policy levels. Each layer can heavily influence other layers. The SEM often needs modifications in order to suit different health behaviors and populations. For example, assessing physical activities using the SEM is different for adults and children because they participate in different physical activities and have varying levels of control over what they are exposed to on a daily basis. As a result, interventions aimed at these two populations are different. Although the components of the SEM do not change, using them with different populations will change the examples within each component, based on the make-up of a population group. Figure 3 is a pictorial rendition of the socioecological model (SEM).

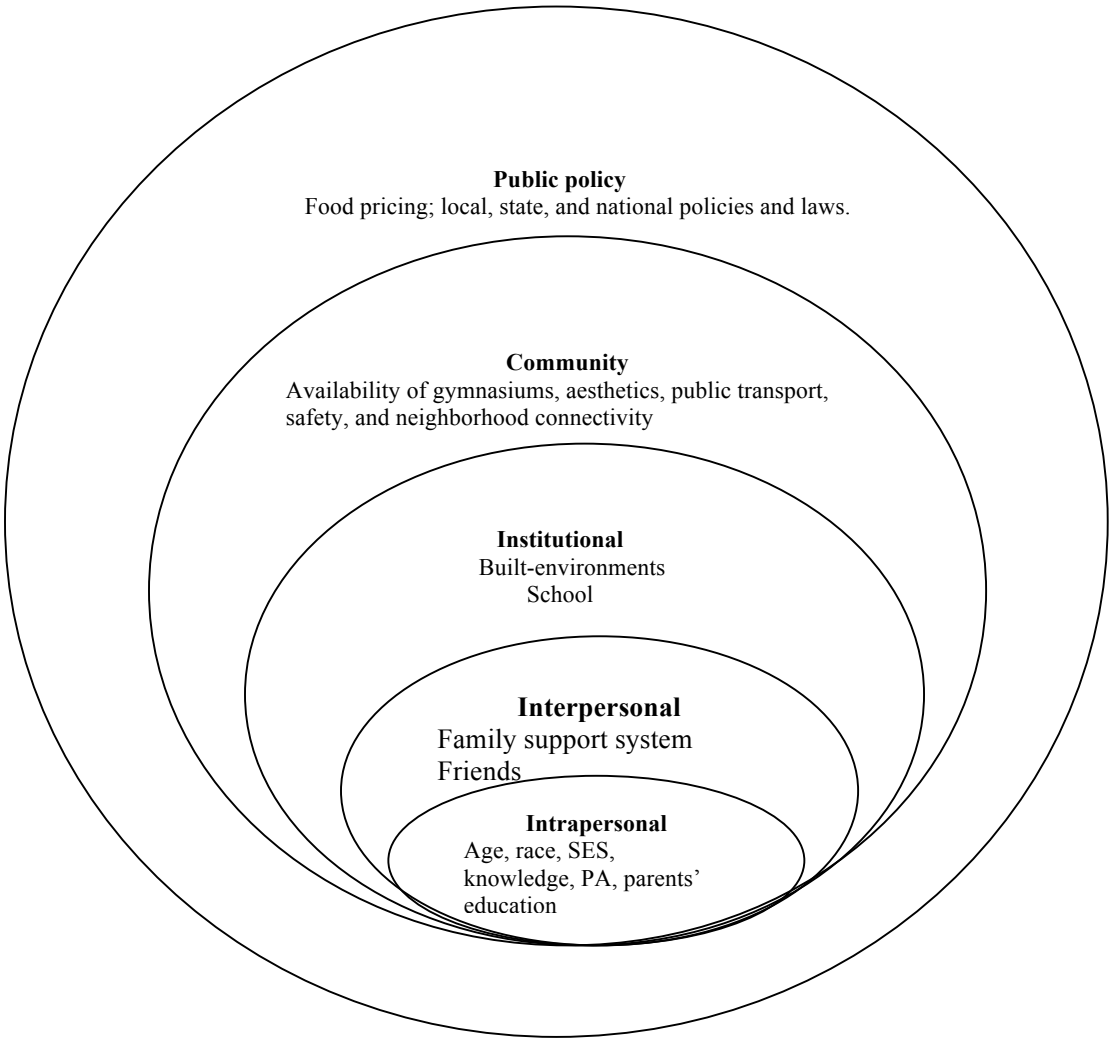


Figure 3. A pictorial rendition of the socioecological model (SEM).

Intrapersonal Level

The intrapersonal level of influence represents the most fundamental level of the model. The health behavior theories employed at this level of influence focus on existing actions or behaviors that occur in the individuals' minds (Waters et al., 2011). At the center of the SEM stands the individual. At the intrapersonal level, there is interaction

between various personal factors that influence an individual's physical activity, thus either increasing or minimizing the likelihood of obesity. Some of the factors that affect an individual's participation in physical activities include sex, age, education, self-efficacy, employment status, skills, and knowledge (Sarrafzadegan et al., 2013). Strategies that can be employed to effectuate change at the individual level focus on enhancing people's knowledge, skills, attitudes, and behavior. Such strategies include educational and mentorship programs (Williams, 2011). The intrapersonal level has been the focus of childhood overweight and obesity because it is easy to identify and to analyze the energy imbalance at this level. It is within the individual factors at the intrapersonal level where all the child's ecological influences can be seen (Dev et al., 2013). Health behaviors represent one of the key intrapersonal factors in the SEM. There is a strong association between health behaviors and childhood overweight and obesity. According to Niermann, Kremers, Renner, and Woll (2015), understanding children's health behaviors is key to studying the health outcomes that are caused by the immediate environment. Some of the health behaviors that can determine a child's weight status include nutrition, physical activity, and sedentary behavior (Wijtzes et al., 2014).

Due to the high degree of influence parents have on their children's behaviors, beliefs, attitudes, and knowledge, there is limited or no opportunity to influence childhood obesity and overweight on the individual level (Sarrafzadegan et al., 2013). Therefore, the individual influence on children's weight status is derived from their interaction with teachers, physical educators, counselors, and nutritionists (Sarrafzadegan et al., 2013). Little evidence exists to support the effectiveness of overweight prevention

among children at the individual level because of the highly individualized nature of these influences. Individuals have little control over some factors at the intrapersonal level, including race and gender that could influence their weight status.

Interpersonal Level

The interpersonal level involves interactions between individuals and their family members, neighbors, and friends and the impact of these interactions on the individuals' health behaviors (Bronfenbrenner, 1994). At the interpersonal level, people exist within a social environment that influences them. According to McLeroy et al. (1988), interpersonal relationships play a significant role in the development of social identities because individuals benefit from emotional support from their social contacts. Based on the SEM, social support refers to relationships and cultural factors that the individual interacts with in the neighborhood. Social support has been found to influence physical activity significantly among different populations (Waters et al., 2011). For example, having a friend, relative, or colleagues for company while performing physical activities can influence health behaviors. The interpersonal level involves close relationships that affect children's health behaviors, thus influencing their weight status. According to Fuemmeler, Anderson, and Mâsse (2011), these relationships and influences can lead to children becoming overweight and obese. The individuals who are present around the child tend to influence the child's health behaviors (McLeroy et al., 1988). For example, family members, peers, and the home environment could influence a child's individual behavior. At the interpersonal group level, the child's family is the primary social influence to which he or she is exposed.

Institutional or School Level

Social institutions have organizational characteristics, rules (informal and formal), and regulations that can impact children's health behaviors. According to McLeroy et al. (1988), individuals spend most of their lives in organizational settings that influence their health behaviors. Some of the exposures found at the institutional level include recreation facilities, schools, workplaces, neighborhoods, and faith-based churches (Waters et al., 2011). The institutions determine families' perceptions regarding their children's physical activity behaviors and food choices. Sarrafzadegan et al. (2013) argued that organizations and institutions provide economic and social support that may guide individuals' values, health beliefs, and attitudes. The primary institution that influences children's health behaviors is school. According to the CDC (2013), over 95% of young people in the United States are enrolled in school. Because children spend most of their time in the school environment, school-level influences can significantly impact children's physical activity behavior and weight status (Fuemmeler et al., 2011).

Community Level

Community-level exposures include factors that determine an individual's risk of obesity, based on the community and social environment, including schools, workplaces, and neighborhoods (McLeroy et al., 1988). The common interventions toward child health at the community level are designed to influence the climate and systems. The recent increase in the prevalence of childhood obesity has led to an inquiry into the impact of obesogenic environments on children's weight status (Williams et al., 2014). The manner in which neighborhoods are designed, the presence of parks, proximity to

schools, shopping centers, walking paths, and safety determines whether parents are willing to let their children move freely throughout the neighborhood and participate in physical activity behaviors (Fuemmeler et al., 2011). The constant changes in the built environments of communities has led to the establishment of fast-food restaurants and decreased space for sidewalks and recreational centers, thus impacting a child's physical activities as well as nutritional and sedentary behaviors (Roberts, Ray, Biles, Knight, & Saelens, 2015). Physical environments such as gymnasiums, sports fields, and bike paths are developed for the purpose of physical activities, while other institutions such as schools, workplaces, churches, and theaters offer restricted amounts of physical activity. The physical environment also includes weather and geography, in addition to the availability of recreational facilities such as gymnasiums and sporting grounds, aesthetics, public transport, safety, and neighborhood connectivity (Katzmarzyk et al., 2013). Built environments provide opportunities for the development of strategies to increase physical activity, including the introduction of bicycle and walking paths and parks in new housing projects and improving accessibility to these paths (Waters et al., 2011). Conversely, the natural environment focuses on reducing barriers to physical activity because of the few opportunities for intervention. At the physical level of influence, strategies are mainly aimed at the requirements that should be available in the environment, before educational and awareness interventions are implemented (Waters et al., 2011).

Policy Level

The policy level represents the top-most layer of the SEM. The policy level involves all the regulatory, legislative, or policy-making activities that affect an individual's physical activity behaviors in the community (Walters et al., 2011). Policy influences include formal legal actions taken by federal, state, and local governments that are aimed at changing community health behaviors. Examples of such policies include health, funding, education, environmental, active transport, and workplace policies. While establishing policies on physical activities may be easy, the development of the political climate required for the successful implementation of such policies proved to be quite difficult.

According to Waters, Swinburn, Seidell, and Uauy (2011), interventions that support individuals' participation in physical activities can reduce the likelihood of obesity. Numerous environmental and policy changes have been made to address obesity and develop a healthy environment that facilitates energy balance in children (Brennan, Brownson, & Orleans, 2014). The major research stakeholders in the United States have increased funds to aid research into sustainable, usable, efficient, and cost-effective policies that can reverse childhood obesity and the overweight epidemic (Brennan et al., 2014). Current policies intended to address childhood overweight and obesity are focused on in-school food consumption and health status. Examples of policies that impact childhood health and weight status include the Healthy, Hunger-Free Kids Act of 2010 and the U.S. Department of Agriculture (USDA) Food and Nutrition Service (USDA, 2017). Based on new policies, schools are required to include goals for nutritional

education, nutritional promotion, physical education, and nutrition guidelines for all foods and beverages in the school (USDA, 2017). Additionally, schools are required to do an annual assessment, reporting, monitoring, and updating the established policies (USDA, 2017).

The SEM is based on four major concepts. The first concept builds on the idea that multiple factors influence health behaviors. Therefore, it is important to base interventions on the interrelationship between all four levels of the SEM. The second concept holds that environments are multidimensional and complex. According to Mehtälä, Sääkslahti, Inkinen, and Poskiparta, (2014), social and physical environments contain numerous features such as temperature, size, safety, and connectivity, which interact to varying degrees, thus influencing physical activity. The third concept is based on the fact that the relationship between human beings and their environment can be described at various levels of influence (Waters et al., 2011). The human-environment interactions can happen at the intrapersonal, interpersonal, and community levels. In addition to focusing on the individual, the SEM also describes the multilevel interactions between people and the environment. The final concept of the SEM is that interrelationships between individuals and the environment are dynamic in nature (Waters et al., 2011).

Although all of the described levels are present, I focused on the environmental level and its effect on an individual's perception of security or insecurity in his or her immediate surroundings, safe play areas, and whether parents or guardians are able to watch the children while they are on the playground (Weinstein, Felgley, Pullen, Mann,

& Redman, 1999). While some studies have associated lack of environmental security with increased risk for childhood obesity, neighborhood safety through social and built environments plays an influential role in childhood obesity (Rech et al., 2012). Researchers studied the relationship between sense of security among members in communities with high crime rates and the risks for childhood obesity. The association is such that when a community is deemed unsafe for outdoor activities, children are not allowed to engage with outdoor activities; they rather spend long stretches of time indoors. Additionally, children who live in neighborhoods with inadequate facilities for recreational activities or restricted spaces for regular physical activities, unsafe sidewalks, inadequate street lighting, and social issues such as high crime and drug rates may afford limited or no outdoor activity (Rech et al., 2012).

Literature Review Related to Key Variables and Concepts

The literature review for this study was focused on the impact of neighborhood-level factors that influence childhood obesity among African-American children in California. Further attention was directed toward studies that examined the relationship between childhood obesity and the built environment. Additionally, the review covered environmental variables that were found to influence overweight and obesity.

Childhood Obesity

Childhood obesity has developed into a major health concern worldwide. According to the CDC (2016b), the prevalence of obesity among children in the United States is approximately 8.9% among children, aged 2-5years, and 17.5% for those aged 6-11 years. Apart from affecting the development of the child, obesity is also linked to

diabetes, hypertension, and other cardiovascular diseases (Ogden et al., 2012). There are complex interactions between nutrition, sedentary lifestyle, genetics, environment, and psychosocial factors that lead to obesity among children. According to Sarrafzadegan et al. (2013), obese children have a tendency to consume unhealthier foods, including salty and fatty foods, compared to children with a normal weight status.

Additionally, obese children are more likely to take part in fewer physical activities, and they tend to spend more time watching television (Casey et al., 2014). Genetics has been found to increase a child's risk of obesity; therefore, children of obese parents are highly susceptible (Ogden et al., 2012). In addition, race and SES are other demographic characteristics linked to obesity among children (Ogden et al., 2012). Based on research, once children develop obesity, their susceptibility to other adverse health outcomes is greatly increased (Casey et al., 2014). Compared to other races, African-American children from rural settings are at a greater risk of obesity than others (Ogden et al., 2012). Thus, there is a need to understand the risk factors that expose children to obesity and how to develop effective obesity-prevention interventions.

Neighborhood Safety

Neighborhood safety has also been found to influence the amount of physical activity and exercise that adults, adolescents, and children engage in (Brockman, Jago, & Fox, 2011). Studies indicated that low levels of perceived neighborhood safety led to reduced physical activity levels, thus increasing the likelihood of the children's developing obesity (Li, Barnett, Goodman, Wasserman, & Kemper, 2013). Parents living in areas with high rates of crime and violence tend to reduce the amount of physical

exercise their children can participate in, which negatively affects the child's health. Community safety has also been found to have greater influence on the choice of physical activities of females than males (Brussoni, Olsen, Pike, & Sleet, 2012).

While the association between neighborhood-level factors such as safety and walkability have been found to impact the likelihood of obesity among adults, this association has not been conclusively established among children (Brussoni et al., 2012). Further, limited research exists regarding the impact of neighborhood-level factors on childhood obesity. Individual perceptions of the level of safety in a neighborhood can significantly affect physical activity behaviors. Researchers have identified that neighborhood safety influences the amount of physical exercise children perform (Tandon et al., 2012). Areas with high rates of crime and violence appear to have higher rates of childhood obesity, compared to relatively secure neighborhoods (Tandon et al., 2012).

Neighborhood safety has been examined within both the social and built environments. In a cross-sectional study, Rech et al. (2012) found that individuals' perceptions of neighborhood safety were directly associated with physical inactivity. However, the results of this study varied, based on sociodemographic variables. The target population for the study was 1,261 adults, aged 18-69 years, in Curitiba, Brazil. The findings of the study indicated that perceptions of lack of safety were higher among female, overweight, older, and high-income participants. Based on this study, it was surmised that women, individuals with higher incomes, and older persons experienced low levels of neighborhood safety in the community more intensely, which could

influence their physical activity behaviors. Rech et al. (2012) posited that people with a dim perception of community safety are not very likely to participate in physical outdoor activities. Conversely, Rech et al. (2012) argued that most of the individuals who perceived low neighborhood safety bought fitness activity apparatuses for use in their homes. However, ownership of the exercising devices at home did not guarantee that the owners would actually use them.

Neighborhood Walkability

According to Duncan et al. (2014), different built environment traits can either decrease or increase children's physical activity levels. Such characteristics in the environment that encourage routine participation in utilitarian physical activity, leisure physical activity, or exercise can contribute to decreasing childhood obesity (Bennett et al. 2008; Cradock & Duncan, 2014). A variety of built environment features can produce different physical activity results; for instance, parks are usually connected places for physical relaxation activities, while land-use mix is associated with transport physical activity (Ding et al. 2011; Ferdinand, Sen, Rahurkar, Engler & Menachem, 2012). Therefore, neighborhood walkability can be achieved with structures that are put in place within communities and are maintained by individuals, which in turn encourages regular and safe physical activities that prevent weight gain and reduce childhood obesity (Cradock & Duncan 2014).

The White House Task Force Report on childhood obesity commented on built environments as one of the determining factors of childhood obesity (Executive Office of the President of the United States, 2010). However, several other studies produced

different findings about the impact of neighborhood walkability (Dunton, Kaplan, Wolch, Jerrett, & Reynolds, 2009; Feng, Glass, Curriero, Stewart, & Schwartz, 2010). For example, Dunton, Kaplan, Wolch, Jerrett, and Reynolds (2009) and Feng, Glass, Curriero, Stewart, and Schwartz (2010) conducted a systematic review of studies and found that, while some literature reported statistically significant relationships between characteristics of neighborhood walkability and risk for childhood obesity, other researchers did not find any such association. Hoyt et al. (2014) did not find an association between neighborhood walkability and obesity risk. Yet, some neighborhoods did have built characteristics that could promote healthy behaviors, reduce risks for obesity by encouraging routine physical activity, and maintaining safe walkable neighborhoods.

High traffic concentration within residential areas can be an inhibition for physical activity because these areas are considered unsafe for walking (Ding et al., 2011). This is also true for neighborhoods with high speed limits where parents and youths may feel unsafe to walk on the streets, and walkability of neighborhoods can be reduced as a result (Ding et al., 2011). By contrast, neighborhoods that have many intersections can give people more options of walkable routes and encourage increased walking within the neighborhood as, for instance, to supermarkets and stores, recreational facilities, churches, and parks (Ding et al., 2011; Krizek, 2003).

The Built Environment

The built environment involves numerous social and physical variables that form the structure of a given community and may affect children's health behaviors and

obesity (Casey et al., 2014). According to Mehtälä et al. (2014), physical activity levels of children can be determined by a host of environmental structures that may promote or discourage physical activity, hence affecting the rate of obesity among children. For instance, neighborhood walkability, availability of recreational facilities, and community safety have been found significantly to impact the levels of physical activity among children (Mehtälä et al., 2014). Other factors that may influence physical activity levels include population density, transportation networks, availability of public spaces, and housing in the neighborhood (Mehtälä et al., 2014). The impact of the built environment on the development of obesity has attracted considerable interest over the past few decades. Some of the environmental features that have been found to affect neighborhood walkability include high population density, street connectivity, and land use. Researchers argued that these elements could increase the amount of physical activity and reduce obesity among adults (Sandy, Tchernis, Wilson, Liu, & Zhou, 2013). These environmental features have also been linked with children's ability to walk or ride bikes to school (Sandy et al., 2013).

Casey et al. (2014) found evidence of a relationship between the presence of restaurants, parks, and food outlets and the weight status of the inhabitants. The study was based on the Environmental Links to Physical Activity, Nutrition, and Health (ELIANE) framework and involved a systematic review of the relationships between the built environment's spatial measurements and obesity among youths (Casey et al., 2014). The analysis consisted of 25 studies involving 20 population studies, where 18 studies

reported significant relationships. The study indicated that neighborhood walkability and spatial accessibility had a substantial relationship with weight status among the youths.

Another study by Carroll-Scott et al. (2015) examined the impact of school and neighborhood environments on obesity among preadolescent children in order to determine the rate of childhood obesity during preadolescence. This study consisted of health surveys and physical measures, which were randomly taken from fifth- and sixth-grade children in Connecticut, during the year 2009. A total of 811 preadolescent pupils were measured, with the major focus being directed on school connectedness, school and neighborhood SES, and neighborhood social ties. The results of the study indicated that a greater perception of connectedness by students with the school was positively associated with reduced BMI. According to Carroll-Scott et al., the association between school connectedness and BMI was stronger among students who lived in high-income neighborhoods.

Carroll-Scott et al. (2015) concluded that the methods used by the schools to support students could influence childhood obesity among children from high-income areas. The extent to which obesity is associated with built environments also affects the effectiveness of community-level interventions. Whereas most of the recent studies concentrated on the impact of built environments on adult obesity, evidence of the influence of built environments on childhood obesity is limited.

Neighborhood Socioeconomic Status (SES)

Despite research evidence indicating a relationship between neighborhood SES and physical activity, little evidence exists supporting the impact of such environments

on children and adolescents (Brockman et al., 2011). In a study conducted in the United States, Kimbro et al. (2011) found that watching television versus playing outdoors significantly impacted children's BMI. Kimbro et al. also examined the effects of SES, type of dwelling, collective efficacy, and physical disorder using a negative binomial regression model. The researchers found that the number of hours played outdoors was inversely related to BMI; while the number of hours spent watching television was directly related to BMI. Kimbro et al. suggested that neighborhood SES may impact children differently, thereby influencing their physical activity behaviors in different ways.

In a cross-sectional study by Bjornstrom (2011), the authors found that a disparity in income among families affected the occurrence of childhood obesity, irrespective of neighborhood SES. The study's main purpose was to examine the association between local income inequalities and increased risk of obesity among the residents of Los Angeles County. A total of 2,875 participants from 65 neighborhoods took part in the study. Logistic regression indicated that, while controlling for neighborhood SES, income inequality among participants significantly influenced obesity risk. Bjornstrom also found that collective efficacy was independently associated with a reduction in obesity risk among the participants, but did not interfere with the relationship between income disparity and the likelihood of developing obesity. In conclusion, Bjornstrom stated that economic disparities and social resources significantly reduced the risk of obesity in a neighborhood.

Neighborhood Food Availability

Neighborhood food security is essential to the development and growth of human beings. Various researchers have studied the association between neighborhood food environments and obesity, chiefly focusing on the distribution of fast-food restaurants, supermarkets, and food consumption behaviors. According to Richardson, Boone-Heinonen, Popkin, and Gordon-Larsen (2011), the availability and accessibility of supermarkets in a given neighborhood reduced the likelihood of childhood obesity because supermarkets ensured that high-quality diets were available in the community. Richardson et al. argued that individuals who had fast-food restaurants within a 3 mile radius of their homes consumed more fast foods than others. Additionally, the authors identified that individuals' BMI was directly associated with the proximity of fast-food restaurants in a neighborhood, while proximity to supermarkets was negatively associated with BMI. The authors also found an association between prolonged consumption of fast foods and increased risk for overweight and obesity among children and adolescents.

A study by Laska, Murray, Lytle, and Harnack (2012) indicated the existence of a relationship between soda intake and high BMI among children. Laska et al. examined the extent to which adolescent consumption of diet soda, fast foods, breakfast, and sugar-sweetened beverages impacted the participants' percentage of body fat (PBF) and BMI. The random coefficients method was used to analyze the relationship between dietary intake and adolescents' PBF and BMI. The findings of this cross-sectional study indicated that breakfast consumption was indirectly related to the PBF and BMI of the participants, while intake of diet soda was directly linked to increasing PBF and BMI.

The longitudinal study indicated that consumption of sugar-sweetened beverages was directly linked to increased PBF and BMI among male participants (Laska et al., 2012).

Boone-Heinonen et al. (2013) found in their study that improvement in food retail and presence of physical activity environments in a neighborhood could combine to reduce obesity effectively among individuals. The study's main purpose was to examine the cumulative and interactive impact of physical activity environments and food retail in a neighborhood on the BMI of individuals in their early adulthood. The study indicated that the presence of an increased number of fast-food restaurants in a neighborhood predicted increased rates of obesity.

Supportive Neighborhood Environment

The perceived and objective social-support components of a neighborhood can influence children's participation in physical activity, thus affecting their likelihood of obesity. Borrell, Graham, and Joseph (2016) executed a cross-sectional design to investigate the relationship between neighborhood support and neighborhood safety and the resulting impacts on childhood obesity and overweight. This study utilized a sample of 40,730 participants from the 2011-2012 National Survey of Children's Health. The results of this study indicated that, after adjusting for sex, race/ethnicity, age, poverty, asthma, physical activity, sedentary activities, and parents' education, adolescents and children living in nonsupportive neighborhoods were 20% more likely to develop obesity, compared to children from supportive neighborhoods. In conclusion, Borrell et al. stated that living in unsafe and nonsupportive neighborhoods could result in obesity among adolescents and children in the United States. In a similar study, Herzer, Zeller, Rausch,

and Modi (2011) investigated the association between perceived social support and obesity-specific quality of life among adolescents. After surveying 74 obese youths and caregivers, Herzer et al. found that parents and close friends were the main sources of social support for children and adolescents. The findings of this study indicated that teacher and parental support was associated with BMI among obese youths.

Summary and Conclusions

Childhood obesity is one of the major public health issues in the United States. The prevalence of childhood obesity has more than doubled over the past 3 decades, while that of adolescents has tripled (Ogden et al., 2012). While abundant research has been conducted about the impact of neighborhood-level factors on adult obesity, the association between childhood obesity and neighborhood-level factors is unclear and sparsely researched. Use of the SEM in this study facilitated the examination of neighborhood-level factors on childhood obesity. This review was mainly aimed at closing a gap in the professional literature regarding the impact of neighborhood-level factors on childhood obesity rates among African-American children in California.

Based on this review, it was evident that various factors existing in a child's environment influenced the child's eating habits and physical activity level. The majority of the reviewed literature showed that the distribution of recreational facilities, restaurants, and community parks affected children's level of physical activity and thereby also the risks of overweight and obesity. Additionally, early identification of risk factors in the neighborhood that could change a child's physical activity behaviors appeared to be essential for the child's growth and development. Based on the reviewed

literature, most researchers supported the maintenance of safe neighborhoods and accessibility to healthy foods for adequate control of obesity among children.

Additionally, these interventions should include both built and social environments in order to achieve better health outcomes. The authors also recommended that more research be aimed at identifying and developing interventions that could be used with children in high-risk areas to reduce the likelihood of obesity. In the next chapter, I provide an in-depth discussion of the methods used to answer the research questions guiding this study. I describe the research design and rationale for its use, data collection instruments, data collection and data analysis procedures, threats to validity, and ethical procedures observed in this study.

Chapter 3: Research Methods

Introduction

The purpose of this study was to evaluate the relationship between neighborhood-level factors and obesity among African-American children, aged 5-11 year and living in California. I assessed the body mass index (BMI) of African-American children in relation to neighborhood predictors of childhood obesity such as physical safety, physical activity, parents' education level, neighborhood built environments, and neighborhood walkability. I intended to close a gap in practice and in the professional literature regarding neighborhood environmental factors and childhood obesity. Understanding the association between neighborhood-level predictors and obesity among African-American children supports and expands ongoing research on childhood obesity and the health threats it poses to American children. This chapter provides a comprehensive description of the methodological approaches I employed in this study, using secondary data from the California Health Interview Survey (CHIS). This chapter also describes the research design and rationale, data collection and data analysis procedures, instrumentation, threats to validity, and ethical procedures observed in this study. This chapter also contains an in-depth description of the CHIS 2009-2014, the sampling design employed by the CHIS, and its data collection and data management methods.

Research Design and Rationale

Although the CHIS 2009-2014 data sets have many variables, I used only three variables to answer the research questions posed for the study through hypothesis testing. The children's BMI was the dependent variable, and neighborhood factors such as

neighborhood safety and neighborhood walkability were the independent variables. I used a quantitative research design with multivariate logistic regression to test the hypotheses associated with the research questions. Multivariate logistic regression is a nonexperimental design that is used to explain the relationships, if any, between variables (Sullivan, 2012). Multivariate logistic regression analysis is a commonly used quantitative method in public health studies to measure associations between more than one independent variables and a single continuous dependent variable (Sullivan, 2012). This analytic technique can be applied to account for multiple confounding variables concurrently. A multivariate logistic regression model could also be used to evaluate confounding and effect modification as well as examine impacts of multiple risk factors on a dichotomous outcome (Sullivan, 2012). Additionally, this technique is applied solely to adjust for or to justify the differences in confounding variables that are being used in a study (Sullivan, 2012).

The advantage of using a quantitative multivariate logistic regression design resides in the fact that it provides empirical evidence on whether a significant relationship exists between two or more variables (Creswell, 2014). Although the evidence from a multivariate logistic regression design is not sufficient to establish causality, it improves the researcher's understanding of the study variables (Sullivan, 2012). The rationale for choosing the quantitative research design for this study was my desire to arrive at a deeper understanding of the scale of measurements and the relationships and variations between the independent and dependent variables. The quantitative multivariate logistic regression design was the most suitable approach for this study because it facilitated the

objective examination of the theoretical model and the relationships between the variables (Creswell, 2014).

I used secondary data from the CHIS database to study neighborhood predictors of childhood obesity on African-American children, aged 5-11years, in California. The term *secondary data* refers to data that have already been collected by other individuals for purposes other than the present research (Cheng & Phillips, 2014). The CHIS uses a cross-sectional survey of individuals, aged 0-18 years and older, in California. The main benefit of using secondary data is that it is readily available at affordable costs (Johnston, 2014). Thus, researchers who lack adequate funding for their projects can benefit from affordable secondary data. In addition, secondary data that are available online are thoroughly cleaned by professionals who also provide the data collection and cleaning methods (Cheng & Phillips, 2014). However, secondary data also have some limitations. For example, secondary data involve data that were collected for another purpose other than that of the current study (Creswell, 2014). Thus, secondary data may not sufficiently address the research questions or test the hypotheses of the present study (Cheng & Phillips, 2014). Another disadvantage of secondary data is that there is no information available regarding any issues that occurred during the collection process (Johnston, 2014). As a result, the interpretation of variables in the data set may be compromised (Edmonds & Kennedy, 2012).

Three research questions were guiding this study:

1. What is the association between neighborhood safety and BMI among African-American children, aged 5-11 years and living in California, after

adjustment for all other variables?

2. What is the association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
3. What is the association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?

I used the first research question to evaluate the impacts of neighborhood safety among African-American children's BMI. I applied the second research question to evaluate the relationship between neighborhood support by people in the community to each other and BMI among African-American children, aged 5-11 years and living in California. I used the third research question to determine the association between neighborhood park/playground/open-space safety and BMI among African-American children, aged 5-11 years and living in California, after adjusting for all other variables.

Methodology

Population

Population refers to an extensive collection, or set, of objects or people that have the same characteristics (Eldredge et al., 2015). A population usually consists of a large number of individuals, thus cannot be studied in its entirety (Creswell, 2014). Therefore, studies are conducted on samples that are drawn from the population and that have adequate information about a particular population parameter (Creswell, 2014). The population of interest in this study was African-American children, aged 5-11 years, in

the state of California. I chose children for this study because of the increased prevalence of obesity among children over the past 3 decades (Ogden et al., 2012). The rate of obesity among children aged 6-11 years has doubled over the past 2 decades (Ogden et al., 2010). The CHIS 2009-2014 involved self-reported data from African Americans, Whites, Asians, Latinos, Native Americans, Alaska Natives, and Pacific Islanders (CHIS, 2016). The CHIS collects a wide range of data about individuals of all age groups regarding health status, health insurance coverage, health-related behaviors, demographic characteristics, and prevalence of chronic diseases.

Sampling Procedures

Sampling refers to the process of selecting a particular number of elements or individuals from a statistical population with the aim of estimating the characteristics of the entire population (Creswell, 2014). The main purpose of sampling is to achieve a representative sample that the researcher can use to make accurate generalizations about the whole population of individuals (Wisdom, Cavaleri, Onwuegbuzie, & Green, 2012). When selecting samples, researchers mainly focus on getting highly representative samples (Creswell, 2014). The difference between the two main types of sampling, probability and nonprobability sampling, is whether randomization is performed during sample selection. Creswell (2014) explained that randomization occurs when all the members of the set have an equal likelihood of being selected into the sample. Quantitative research designs mainly employ probability sampling due to various benefits (Wisdom et al., 2012). For instance, the risk of selection bias is significantly reduced in probability sampling, compared to the nonprobability approach (Wisdom et al., 2012).

Probability sampling is also easier, less time consuming, and more cost effective, and it employs random numbers, ensuring that the variations in the sample are the same as those in the general population (Creswell, 2014).

The CHIS survey is conducted biannually with the use of a multistage sample design (CHIS, 2016a). The CHIS employs a telephone survey that uses random digit dialing (RDD) of the prospective samples' cellular telephone and landline numbers (CHIS, 2014). In addition, the CHIS employs a list of samples to supplement some ethnic and racial groups and an area sample that is used to evaluate nonresponse bias (CHIS, 2016b). The CHIS is conducted by the University of California, Los Angeles (UCLA)—Center for Health Policy Research (CHPR), in collaboration with the California Department of Health, the Public Health Institute, and the Department of Health Care Services (CHIS, 2014). There were numerous strengths and limitations associated with choosing CHIS data for this study. One of the advantages of using the CHIS data set was its ready availability and that it could be easily accessed through the UCLA-CHPR Website free of charge (CHIS, 2016b). The CHIS data sets are large and designed to provide a complete representation of the diverse populations in the state of California (CHIS, 2016a). As a result, the estimates obtained from these data are generalizable to the entire population of children, aged 5-11 years, in the state of California. As the most populous state in the United States, California has a racially diverse population living in rural, exurban, urban, and suburban areas (CHIS, 2014). Therefore, there is a high likelihood that the CHIS survey obtains health information from individuals who live in a

wide range of food environments, which can then be generalized to other food environments at the state level (CHIS, 2014).

A potential limitation of CHIS is that the response rates can lead to questions regarding a potential nonresponse bias (CHIS, 2016a). The children's weight and height parameters are also based on reported data; thus, there is a high likelihood of response bias (CHIS, 2014). However, no study has reported evidence of nonresponse bias in the CHIS, and the respondents are believed to provide representative data for California.

The CHIS sampling design is intended to achieve two primary objectives: (a) to obtain estimates for sparsely populated counties and groups of counties and (b) to provide the overall estimates for California, including major and minor racial and ethnic groups (CHIS, 2014). In previous CHIS surveys, American Indians, Latinos, Cambodians, Japanese, Koreans, South Asians, and Alaska Natives were sampled (CHIS 2014). In the CHIS 2009-2014 sample, a dual-frame, multistage sample design was used to achieve the two aforementioned objectives (CHIS, 2016a). The RDD sample comprises telephone numbers assigned to cellular-service and telephone-landline samples. According to the CHIS (2014), the RDD sample was formed to facilitate complete adult interviews for 80% and 20% of landline and cellular numbers, respectively. Through the use of the cell phone RDD and landline RDD sampling frames, the CHIS provided data that were representative of California (CHIS, 2016a). In addition, the representation of Vietnamese, Japanese, and Koreans living in California is assured by use of an additional list of surnames (CHIS, 2014).

Based on stratification, the CHIS has maintained the same approach since CHIS 2005 (CHIS, 2016c). Using all 58 counties in California, the CHIS established 44 geographic strata and 14 substrata within San Diego and Los Angeles Counties, which had the highest population in the state (CHIS, 2016a). The eight substrata in Los Angeles represent Service Planning Areas, while the six substrata in San Diego represent Health Service Districts (CHIS, 2016a). Of the 44 substrata, 39 consisted of individual counties without substrata, while the 17 remaining counties comprised three multicounty strata (CHIS, 2016a). Oversamples of three counties (Tuolumne, Siskiyou, and Calaveras, where supplemental landline samples were taken for a combined sample of 400) were also included in the CHIS 2009-2014 sample as part of the multicounty strata (CHIS, 2016c). The CHIS conducted an additional address-based sample of 500 households in Sonoma County, while a list sample was employed to complete oversamples of approximately 104 Korean Americans, 120 Vietnamese Americans, and 130 Japanese Americans (CHIS, 2016c). An adequate number of adult interviews were then distributed to each stratum and substratum to achieve the first objective of the CHIS sample design.

The CHIS employed telephone interviews that were conducted with adults and adolescents from each household who were contacted using geocoded addresses (CHIS, 2014). The selected adult individual had to be a parent or guardian who had adequate knowledge about the care and health of the child (CHIS, 2016c). The households were chosen randomly using either cell phone or landline telephone frames or both (CHIS, 2016c). Eligible households were those that contained individuals, extended families, or unrelated people, provided there were no more than nine in number to form the

household (CHIS, 2016a). The CHIS survey does not involve institutional residences such as jails, prisons, psychiatric hospitals, juvenile detention facilities, and long-time care and extended-stay treatment programs (CHIS, 2014a). Also excluded from the CHIS survey are homeless populations and group quarters that have over nine unrelated individuals (CHIS, 2014).

The purpose of using multistage sampling in the CHIS survey is to estimate the representativeness of the data on the state level (CHIS, 2016c). The list-assisted RDD sampling approach is the standard method of choice for most researchers who conduct telephone surveys. The list-assisted RDD approach leads to the development of an unclustered sample with outstanding operational features (CHIS, 2016a). List-assisted sampling is performed by, first, developing a set of all telephone numbers using operational telephone prefixes that comprise 100-banks (CHIS, 2014). Each of these banks contains 100 telephone numbers that share the first eight digits (CHIS, 2014). A sample frame is developed using all the 100-banks that contain at least one residential number in a telephone directory (CHIS, 2016c). A systematic or random sample of the telephone numbers is selected from this sampling frame (CHIS, 2016c).

One of the limitations of the list-assisted RDD approach is the small amount of noncoverage resulting from telephone numbers from the 100-banks that are not sampled because they lack telephone numbers that are listed in telephone directories (Clagett et al., 2013). The evidence shows that the likelihood of bias in the list-assisted RDD method is small (CHIS, 2014). The CHIS telephone interviews were exposed to coverage error because non-English speakers were not interviewed due to the language barrier despite

being sampled (CHIS, 2014). According to Clagett et al. (2013), increasing the overall sample of the CHIS is the easiest approach to improving the reliability of the estimates. However, the most efficient way to enhance the reliability of the samples is oversampling (CHIS, 2016a). Weights are also applied to the CHIS data to ensure that findings from these data are unbiased and representative of all Californians (CHIS, 2014). In addition, the weights control for nonresponse bias, correct undercoverage, and account for selection probabilities (CHIS, 2014).

Power Analysis

Power analysis is an approach to estimating sample size based on a statistical relationship between the variability of the data and effect size (Murphy, Myors, & Wolach, 2014). Power analysis provides researchers with the information that is needed to answer the research questions accurately (Creswell, 2014). It is important to conduct a power analysis before a quantitative study is conducted to determine whether the power of the sample is sufficient (Poolman, 2013). The power of a sample refers to the probability that the null hypothesis will be rejected as a result of a significant statistical difference existing between the dependent and independent variables in the study (Murphy et al., 2014). Also, a power analysis can denote the ability of a statistical test effectively to detect an effect, provided the effect exists (Creswell, 2014). Because this study is quantitative in nature, I conducted a power analysis to obtain the most appropriate sample size. In this study, I used secondary data variables from the CHIS data set to answer the research questions. I conducted a power analysis using the G*Power 3.1.9.2 tool. The minimum sample size for this particular statistical test with a power of

0.80, a medium effect size of 0.30, and α of 0.05 was $N = 557$ participants to detect a significant model (Creswell, 2014). A null hypothesis is rejected if the p value is less than 0.05; it must be accepted when the p value is greater than 0.05 (Poolman, 2013). The effect size indicates the strength of the relationship between the independent and dependent variables (Poolman, 2013). The effect size can either be small, medium, or large. Small effect sizes have $\rho = 0.1$, while medium and large effect sizes are denoted by $\rho = 0.3$ and $\rho = 0.5$, respectively (Creswell, 2014).

In quantitative research, a sample size that provides 80% power at a 95% confidence interval ($p = 0.05$) is usually sufficient (Creswell, 2014). To determine the correct sample size for a study, a compromise power analysis, a priori, and post hoc tests are performed (Poolman, 2013). Statistical power is associated with large sample sizes; thus, the larger the sample, the greater the statistical power (Poolman, 2013). Also, a large sample size with fewer variables to be measured provides more accurate estimates (Creswell, 2014). The major goal of conducting a power analysis is to minimize the likelihood of a Type II error, which arises when a faulty hypothesis is not rejected (Poolman, 2013). The dependent variable in this study was children's BMI, while the independent variables were neighborhood safety, neighborhood support, and neighborhood park/playground/open-space safety.

Procedures for Recruitment, Participation, and Data Collection

Procedures for recruitment and participation. The CHIS is conducted annually with thousands of residents from California to achieve a diverse sample that is representative of the state's entire population (CHIS, 2014). The CHIS is the largest

health survey in the United States and covers over 20,000 households; it involves separate interviews with children, adolescents, and adults to provide a broad perspective of the health care needs in the state of California (CHIS, 2015). The state is subdivided into 44 sampling locations that are well-defined, and participants are randomly contacted with RDD (CHIS, 2016c).

The first step in the recruitment process involves the random selection of telephone numbers in each of 44 geographical locations in California (CHIS, 2015b). Of these 44 sampling locations, 41 represent individual counties, while three comprise merged counties that are sparsely populated (CHIS, 2016c). All the counties of California were adequately represented in the CHIS 2009-2014 survey (CHIS, 2016c). Some of the sparsely populated counties were combined into a single sampling area (CHIS, 2015b). From each eligible household, one adult, aged 18 years or over, was selected to participate in the survey (CHIS, 2016a). Another RDD sample was selected using cell phone numbers to compensate for households that did not have a landline (CHIS, 2016c).

The main goal of CHIS the 2009-2014 was to complete approximately 8,000 adult interviews from the cell phone sample (CHIS, 2015c). Households with cell phones-only were first included into the CHIS in 2007 with the aim of attaining an accurate representation of California's diverse population (CHIS, 2016a). Households that used cell phones-only were more likely to be younger and engaged in risky health behaviors. They also appeared to be more mobile than households with landlines, and they were less likely to have health insurance (Sibai, Ghandour, Chaaban, & Mokdad, 2016). Although the availability of geographical information for cell phone numbers was not as reliable as

that for the landlines, cell phone numbers were allocated to all 43 strata. Apart from slight differences in geographical locations, the cell phone stratification approach was quite similar to that of the telephone sample (CHIS, 2016c).

From each selected household, a random adult or adolescent was requested to participate in the study (CHIS, 2016c). For children under 12 years of age, the CHIS interviewed a knowledgeable adult within the household to obtain the children's health information (CHIS, 2016). Based on the CHIS survey, a child is an individual, aged below 12 years, and residing in an eligible household (CHIS, 2014). Eligible children were those belonging legally to the sample adults; excluded were foster and any other children who lived in the household (CHIS, 2016a). Sampling of children in the CHIS survey was dependent on age (CHIS, 2016c). For example, children aged 0-5 years who were associated with a particular adult were sampled at twice the rate of those aged 6-11 years (CHIS, 2016c).

Data collection. To collect data from the diverse population of California, the CHIS conducted interviews using English, Chinese, Korean, Spanish, and Vietnamese (CHIS, 2016a). The rationale for using these five languages was based on the 2000 census data, which indicated the languages used by the majority of Californians in the CHIS sample who did not speak English or have inadequate knowledge of English to participate in the survey (CHIS, 2016a). Westat, a private company that conducts large-scale sample surveys and statistical research, was contracted by the UCLA-CHPR to collect data for the CHIS 2009-2014 survey (CHIS, 2016a). In all the samples, a Westat staff randomly selected one adult from each household and sampled one child and one

adolescent if present (CHIS, 2016c). Therefore, up to three individuals from each household could be interviewed.

In the CHIS 2009-2014 survey, 40,000 adult interviews were conducted involving 32,000 landline telephone numbers and 8,000 cell phone numbers (CHIS, 2016c). The Westat staff administered interviews to adult individuals and adolescents using CATI (CHIS, 2016a). The interviewers contacted respondents using the landline and cell phone samples with the RDD sampling design (CHIS, 2016a). Because ACTI was self-administered, the field interviewers required only training on handling the instrument to effectively answer the respondents' questions (CHIS, 2016c). Although effective for collecting large data sets over a short period of time, accuracy of the CHIS data was dependent on the respondents' memorizing skills and the variation of the measurements that were collected by the field interviewers.

For households in the landline sample that had children and where the sampled adult or parent was not the screener's respondent, children could be sampled during the screening interview (CHIS, 2016c). Also, extended interviews could be conducted before the adult interviews (CHIS, 2016a). The child-first approach was first used in the CHIS 2005 survey and had been adopted in subsequent CHIS cycles due to its effectiveness in increasing the yield of child interviews (CHIS, 2016a). All the interviews were conducted through Westat's computer-assisted telephone interviewing (CATI) platform using the five languages: English, Spanish, Chinese, Korean, and Vietnamese (CHIS, 2016c). On average, each adult interview takes approximately 35 minutes to complete. Interviews with children and adolescents take approximately 15 and 23 minutes, respectively (CHIS,

2014). For the child-first approach, additional information was collected using about 9 minutes (CHIS, 2014). However, interviews that were conducted in other languages than English could take longer.

Procedures for gaining access to the data sets. The secondary data used in this study was retrieved from the UCLA-CHPR database. The UCLA-CHPR provides two types of data to researchers who wish to analyze health data for California: confidential data and the public-use data files (PUFs; CHIS, 2016a). Data from the PUFs is publicly available and free for downloading from the UCLA-CHPR Website. Researchers who wish to use CHIS data can visit the UCLA-CHPR Website and use the PUFs page where they can download the data in PDF, Statistical Analysis System (SAS), Statistical Package for Social Sciences (SPSS), and statistical software package (STATA) formats, after approval (CHIS, 2016b).

The data from the PUFs were accompanied by a data dictionary and contained numerous variables, including the respondents' health-related behaviors, health statuses, health insurance coverage, health care access, and demographic characteristics such as age, race/ethnicity, gender, and residence (urban/rural) among others (CHIS, 2016b). A researcher who wishes to analyze data for specific counties in California, could request data files directly from the UCLA through the data access center (DAC; CHIS, 2016b). Also, to use the PUFs, a researcher had to complete a confidentiality agreement electronically, which was mandatory for gaining access to the CHIS data (CHIS, 2015c). After approval from the UCLA-CHPR, I downloaded and stored the CHIS 2009-2014 survey data sets in SPSS format on my personal computer for analysis.

Permissions to gain access to the data. Seeking approval from relevant authorities is important regardless of whether one uses primary, secondary, or archival data in research (Creswell, 2014). The use of archival data has gained popularity over the past few years due to the advancement of technologies (Sinclair, Wang, & Tetrick, 2012). Archival data involve data that have already been collected for other purposes by an organization or agency and are available in their records (Feng, Ling, Neely, & Roberts, 2014). The main advantages of archival data are that they are less expensive, can be highly accurate, have reasonable validity, and allows for comparisons of historical trends and data between larger populations (Sinclair et al., 2012). However, the use of archival data also has a few limitations. For example, accessing local data is challenging and most of the data are out of date (Sinclair et al., 2012). In addition, the data trends are constantly affected by changes in record-keeping rules. Thus, the data may not be accurate (Feng et al., 2014). Researchers also need to understand how archival data were collected and compiled to evaluate the validity of the data.

Currently, researchers can easily access reliable archival data from databases at relatively low costs compared to conducting primary research (Sinclair et al., 2012). Like primary research, access to archived data is governed by strict ethical codes that prohibit the use of data for any other purposes than research (Singh, 2012). In this study, I used the PUFs, which were downloadable for free after receiving approval. I contacted UCLA-CHPR via e-mail to request approval before using the CHIS data in this research. I also sought approval from the Institutional Review Board (IRB) of Walden University before commencing this study (see Appendices A and B).

All archival research involves personal data, irrespective of whether the archive is private or public (Tesar, 2015). Therefore, appropriate ethics review and approval is necessary before accessing archival data. According to Creswell (2014), it is the responsibility of the researcher ethically to handle the owners or controllers of the archive when using archival data. Thus, explicit agreements between the researcher and owners or archival data should be entered and documented (Feng et al., 2014). The UCLA-CHPR provided a platform for digital-signature forms for researchers who wished to download CHIS data sets (CHIS, 2016b). I read and accepted the terms and conditions of use of CHIS data before accessing and downloading the data. UCLA also required all researchers who used CHIS data to provide appropriate citations of the archive in their works (CHIS, 2016b). Throughout this study, I provide appropriate references to all the data and information from the CHIS.

Instrumentation and Operationalization of Constructs

Instrumentation

The CHIS questionnaire was specifically designed to address issues of the UCLA and other stakeholders regarding costs, respondent burden, and respondent rates. The researchers aimed to develop a questionnaire that would take at most 30 minutes for adults to complete, 20 minutes for adolescents, and 15 minutes for children (CHIS, 2016a). In 2012, UCLA, in collaboration with Westat, started drafting child, adolescents, and adult questionnaires that would cover a wide range of health-related topics (CHIS, 2014). After numerous reviews, a final questionnaire was developed and pretested (CHIS, 2016a). Data collection with the CHIS survey is based on a computer-assisted survey

instrument (A-CASI; CHIS, 2016a). The A-CASI is a data collection technology in which respondents use headphones to answer prerecorded questions (Falb et al., 2017). In the A-CASI framework, each respondent continuously selects answers on a keypad or touch screen (Beck, Guignard, & Legleye, 2014). The A-CASI technology is considered to be effective in collecting highly sensitive data such as violence encounters (Falb et al., 2017).

Before commencement of the survey, all the items in the CHIS questionnaire are designed to ensure that all erroneous responses can be re-evaluated (Falb et al., 2017). The A-CASI technology used in the CHIS 2009-2014 survey facilitated interviewing a large number of respondents with instant recording mechanisms, thus minimizing the likelihood of recording errors. According to Brown, Swartzendruber, and DiClemente (2013), A-CASI allowed for an improved stabilization of interviews because it could automatically identify inconsistent responses and request that the respondent address the issue before concluding the interview. Another advantage of A-CASI is that it can facilitate complex interviews in a manner that would be unachievable using manual interviewing (Brown et al., 2013). The A-CASI framework also accelerated the electronic transmission of data from the field to the office, thus eliminating the need for data entry and data cleaning (Falb et al., 2017). From the interviewers' debriefing section throughout the data collection period, all the interviews were closely monitored by staff from Westat, the Public Health Institute, and UCLA (CHIS, 2014).

Dependent Variable

A dependent variable refers to an outcome factor that is influenced by other factors in a particular study (Creswell, 2014). The values of dependent variables change consistently with any manipulation of the independent variables.

Body mass index (BMI). The dependent variable in this study was the respondents' BMI from the CHIS 2009-2014. According to the CDC, BMI is an individual's weight calculated in kilograms with an adjustment for height in meters (CDC, 2016a). Children's BMI is calculated using their weight (kg) and height (m): BMI = kg/m2, which is plotted on a scale to determine the BMI. The BMI is a reliable measuring tool and was used in this study as an indicator for determining obesity in children. This measurement is consistent with CDC guidelines and growth charts: ≤ 5th percentile for BMI adjusted for age and gender is classified as underweight; >5th and ≤ 85th percentile for BMI adjusted for age and gender is categorized as normal weight; between > 85th and ≤ 95th percentile for BMI adjusted for age and gender is considered overweight; and 95th percentile for BMI adjusted for age and gender is considered obese (CDC, 2016a). In this study, mean BMI was calculated using the child's weight and height as reported by the parents or guardians (CDC, 2016a). Obesity was determined using the CDC's BMI-for-age percentile growth charts for girls and boys aged 2-20 years (CDC, 2016a). The variable was recoded as obesity with two categorical answers: *Yes* or *No*. Table 1 shows the CDC classifiaction of BMI for age and sex for childeren and adolescents.

Table 1

Classification of BMI-for-Age and Sex of Children and Adolescents, Aged 2-17 Years

Classification	Body Mass Index (kg/ m^2)
Underweight	Below the 5th percentile ranking
Normal or recommended weight	≥ 5th and < 85th percentile ranking
Overweight	≥ 85th and < 95th percentile ranking
Obese	> than the 95th percentile ranking

Note. Adapted from Centers for Disease Control and Prevention, 2016b.

Independent Variables

The independent variables used in this study were neighborhood safety, neighborhood support, and neighborhood park/playground/open-space safety.

Neighborhood safety. The physical safety of a particular location can influence children's physical activity behaviors, thus affecting the risk of obesity (Karnik & Kanekar, 2015). In this study, the respondents were asked whether they felt safe in the neighborhood and were provided with these questions: Do you feel safe in your neighborhood? They could choose among the following answers: *All of the time*, *Most of the time*, *Some of the time*, *None of the time*, *Refused*, and *Don't know*. Is there a park, playground, or open space within walking distance of your home? *Yes*, *No*, *Refused*, *Don't know*.

Neighborhood support. Supportive neighborhoods are areas or regions where residents are cooperative and can be trusted to protect all children (Saelens et al., 2012).

According to the U.S. Department of Health and Human Services (HHS, 2012), when there is a lack of neighborhood safety, outdoor physical activities are reduced because children tend to spend most of their time indoors. When individuals perceive their physical environment to be unsafe due to an increase in the crime rate, physical activity levels can decrease and, in turn, lead to high childhood obesity rates. Neighborhood safety, which encompasses built and social environments, plays an important role in determining a child's participation in physical activities and thus influences childhood obesity. The Physical Activity Guidelines Advisory Committee (2008) emphasized the importance of routine physical activity in the promotion of overall health and fitness in children and young adults. The advisory board recommended a daily minimum of 60 minutes of physical activity that included aerobics and age-appropriate muscle-and-bone-intensifying activities for children. Despite the well-known benefits of regular physical activity of children into adolescence and adulthood, the evidence shows that not enough time is devoted to promote high levels of physical activity among children and young adults (HHS, 2012). The Physical Activity Council (PAC) reported a drop from 16.6% in 2010 to 16% in 2011 in physical activity levels among children, 6-12 years of age, and from 16.7% to 16.4% among youths, aged 13-17 years. In the 2011 report by the National Youth Risk Behavior Survey (YRBS), numerous children were reported not even close to accomplishing the daily recommendations of the Physical Activity Guidelines (CDC, 2012c). The HHS (2012) reported that only about 42% of children between 6 and 11 years were able to meet the required daily 60-minutes physical activity guidelines, while among adolescents an estimated 8% achieved the recommended guidelines (Troiano et

al., 2008). The problems with decreased physical and outdoor activities are in large measure related to concerns with neighborhood safety, including the safety of play areas and the attentiveness of parents or other adults in the children's lives while they play outside (Weinstein et al., 1999).

In neighborhoods with inadequate access to spaces that allow for regular physical activities, unsafe sidewalks, poorly lit streets, and high crime rates with the presence of drugs, individuals are discouraged from partaking in outdoor activities in their own communities (Rech et al., 2012; Reis et al., 2010). Gomez et al. (2004) and McGinn, Evenson, Herring, Huston, and Rodriguez (2008) found some association between neighborhood insecurity and inactivity, but conclusive evidence of the association between a neighborhood's lack of safety and inactivity (and overweight) is still lacking. Parks/playgrounds/open spaces in the neighborhood refers to facilities that provide opportunities for people to engage in physical activity and recreation (Duncan, Kawachi, White, & Williams, 2013). In this study, the respondents were presented with the statement: People in my neighborhood are willing to help each other. Their responses ranged from *I strongly agree*, *Agree*, *Disagree*, to *Strongly disagree*. For the statement: People in my neighborhood do not get along with each other, their responses ranged from *I strongly agree*, *Agree*, *Disagree*, to *Strongly disagree*. For the statement: People in this neighborhood can be trusted, the responses were *Strongly agree*, *Agree*, *Disagree*, *Strongly disagree*, *Refused*, and *Don't know*. For the statement: You can count on adults in this neighborhood to watch out that children are safe and don't get into trouble, the responses were *Strongly agree*, *Agree*, *Disagree*, *Strongly disagree*, *Refused,* and *Don't*

know. For the statement: Do you feel safe in your neighborhood? The responses were *All of the time*, *Most of the time*, *Some of the time*, *None of the time*, *Refused*, and *Don't know*.

Neighborhood park/playground/open space safety. Built environments could be described as the various settings of a children's environment that may encourage or prevent them from engaging in required activities. The quality of the children's immediate environmental structures such as walkability of the environment, perception of neighborhood safety or crime rates, and access to recreational facilities can either encourage or discourage participation in physical activities (Ferreira et al., 2007). Story, Nanney, and Schwartz (2009) identified other key factors in environmental structures to include housing, availability of roads, walkways, recreational parks, grocery stores, transportation systems, and population density. Neighborhood schools may lack or offer access to healthy school meals and enough allotted time for physical activity sessions, which may affect the children's weight. Also, Dunton et al. (2009) reported that availability of school playgrounds, proximity to supermarkets, lower population density, and road safety play a role in lowering childhood obesity rates. In contrast to the multifaceted information about children, the availability of recreational facilities in a youth's environment seems to be the single connection to obesity (Spruijt-Metz, 2011). Based on current scientific findings on the built environment, researchers emphasized the significance of community-level influences and immediate environments as determining people's dietary choices, level of physical activity, and health outcomes such as obesity (D'Addesa et al., 2010). The association between obesity and built environments

determines the type of strategies and interventions that should be instituted at the community level. Because the majority of etiologies and interventions regarding obesity are focused on older populations (Feng et al., 2010), the association between built environments and children's health outcome is still not well-researched. However, most of the literature reviewed in Chapter 2 maintained that children's built environments did indeed influence childhood obesity rates. Some of the questionnaire statements were: Has (child) been to a park in the past 30 days? Is there a park, playground, or open space within 30 minutes walking distance of your home? The park or playground closest to where I live is safe during the day? The responses were *Yes*, *No*, *Refused*, or *Don't know*.

Potential Confounders

Neighborhood SES. Sometimes the parents' level of education can determine the adequacy of the their income; however, attaining a college degree does not necessarily provide financial security (Baum, Ma, & Payea, 2010). Attaining a higher educational level only increases an individual's chances of being employed and earning a steady income. Another benefit of having education beyond high school is that people with higher degrees have better exposure to knowledge and understand the importance of healthy behaviors and are good role models for children. Baum, Ma, and Payea (2010) reported that people with college diplomas or undergraduates live healthier lives with lower death rates, engage more with public commitments, and are less likely to make financial investment errors. Due to ongoing economic inequalities in California and crime rates on the rise, there are fewer supermarkets being opened because investors are unwilling to take the risks of building quality stores with fresh fruits and vegetables.

According to Onget, Firestine, Pfeiffer, Poon, and Tran (2008) most supermarkets are located in affluent neighborhoods, deserting low-income communities and leaving them with minimal or no access to affordable and healthier quality foods and thus no food security. Additionally, these low-income communities have more fast-food restaurants and unsafe environments for physical activities that put children at risk for obesity. Neighborhoods that are not safe enough for parents or guardians to allow children to engage in outdoor activities will result in children spending more time at home, watching television or playing video games and being inactive. Because these neighborhoods have high crime rates and are therefore considered unsafe, children spend longer periods of time indoors with limited physical activities (Amorim, Hallal, & Azevedo, 2010). Respondents were asked the following questions: Are you now receiving Temporary Assistance to Needy Families (TANF) or California Work Opportunities and Responsibilities to Kids (CalWORKS)? Possible responses were: *Yes*, *No*, *Refused*, *Don't know*. Are you receiving Food Stamp benefits? Possible responses were *Yes*, *No*, *Refused*, *Don't know*. Is teen receiving Food Stamp benefits? Their responses were: *Yes*, *No*, *Refused*, *Don't know*. Are you receiving Supplemental Security Income (SSI)? Possible responses were: *Yes*, *No*, *Refused*, *Don't Know*. Are you on Supplemental Food Program for Women, Infants and Children (WIC)? Possible responses were: *Yes*, *No*, *Refused* or *Don't know*.

Neighborhood walkability. Neighborhood walkability refers to the safety and quality of neighborhood walking trails, including city streets, that make walking a positive experience (Talen & Koschinsky, 2013). To evaluate this indicator, the

respondents were provided with an open-ended question to indicate the number of days in a week that their child walked between home and school. Based on this question, the respondents were required to answer the following questions: How many days in the past week did you walk, bicycle, or skateboard home from school? During the school year, on how many days during a typical week do you walk, bicycle, or skateboard home from school? In the past 30 days, did you go to a park, playground, or open space? Is there a park, playground, or open space within walking distance of your home?

Demographic characteristics. The demographic features I evaluated were race/ethnicity, age, gender, and parents' educational level. The parent or guardian reported the child's race during the CHIS interviews. Based on the CHIS 2009-2014 survey, respondents were asked to identify the race that best described their child. This question had eight choices: White, Black or African-American, Asian, American-Indian, Alaska Native, Other Pacific Islander, Native Hawaiian, or Other (CHIS, 2016d). The respondent was asked to indicate whether the child was male or female (CHIS, 2016d).

Data Analysis Plan

Statistics form an essential part of research because researchers must summarize research findings and present the information to different audiences. Therefore, it is important to create a data analysis plan that ensures that all stages of the statistical analysis process are effectively executed (Simpson, 2015). After downloading secondary data from the UCLA-CHPR database, I conducted statistical analysis using SPSS software-22. The first stage of statistical analysis involved the calculation of descriptive statistics of the sample. Chi-square tests and multivariate logistic regression were the next

step to analyze the relationships between the dependent (BMI) and independent variables. Throughout the data analysis process, all the statistical tests were conducted at $p = 0.05$ with a 95% confidence interval.

Three research questions were guiding the study, and hypothesis testing was used to find the answers.

- RQ1: What is the association between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
    - *Null Hypothesis (H_0)*: After adjusting for all variables, there will be no association between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California.
    - *Alternative Hypothesis (Ha)*: After adjusting for all other variables, a statistically significant association exists between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California.
- RQ2: What is the association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
    - *Ho2*: After adjusting for all other variables, there will be no association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California.

- *Ha2*: After adjusting for all other variables, a statistically significant association exists between neighborhood support and BMI among African-American children, aged 5-11 years, living in California.

- RQ3: What is the association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
  - *Ho3*: After adjusting for all other variables, there will be no association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 year, living in California.
  - *Ha3*: After adjusting for all other variables, a statistically significant association exists between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 year, living in California.

Threats to Validity

All research designs are susceptible to threats and biases that can affect their internal and external validity (Creswell, 2014). Threats to external validity normally occur when a study is designed for a particular population (Benge, Onwuegbuzie, & Robbins, 2012). In this study, I focused on African-American children, aged 5-11 years, from the state of California. Reliability and validity were the most important properties of a particular test because of the information provided regarding the quality and suitability of the test (Heale & Twycross, 2015). Reliability refers to the consistency or dependability in which a particular test measures variables. Thus, reliability refers to how

well data of a given study measure the characteristics they are supposed to measure (Heale & Twycross, 2015). However, reliability alone is not sufficient. Thus, measures also need to be valid (Heale & Twycross, 2015).

Validity refers to whether a study measures what it is supposed to measure (Creswell, 2014). Validity also refers to the degree of accuracy or trustworthiness of research findings (Heale & Twycross, 2015). Validity can be categorized into two groups: internal and external validity. Internal validity refers to the manner in which research findings are consistent with reality, while external validity involves the generalizability of the findings to other settings (Creswell, 2014).

External Validity

Assessment of validity is the most crucial stage of research whether the researcher is using a quantitative, qualitative, or a mixed-methods design (Creswell, 2014). External validity refers to the extent to which the findings of a particular study can be generalized to an entire population (Heale & Twycross, 2015). Threats to external validity are examined using tests of the degree to which the findings can be generalized across different times, populations, and settings (Creswell, 2014). Campbell and Stanley (as cited by Benge et al., 2012) identified four threats to external validity: the interaction effect of testing, many treatment inferences, the interaction effects of sampling bias and the experimental variable, and the interaction effects of experimental arrangements.

In this study, I had to contend with two threats to external to validity. First, was there threat to generalizability of the findings to the entire population of African-American children in California? The threat to generalizability was likely to be caused by

nonresponses to interview questions. The Hawthorne effect was another potential cause of concern regarding the external validity due to the CHIS data. The Hawthorne effect refers to the process by which participants modify their behavior because of their awareness that they are being interviewed (Bornmann, 2012). According to McCambridge, Witton, and Elbourne (2014), the Hawthorne effect is the most difficult bias to eliminate or to control for in a research design. In this study, there was a considerable likelihood of the Hawthorn effect because the children's data were provided by respondents who may have been trying to provide socially correct responses because they were aware that they were being studied, thus, affecting the validity of the findings.

Internal Validity

Internal validity refers to the extent to which significant changes in the dependent variable can be linked to variations in the independent variables. Therefore, the internal validity of a study is based on degree rather than the presence or absence of changes in the independent and dependent variables. According to Creswell (2014), a researcher's confidence in the findings is directly proportional to the internal validity of the research design employed. Campbell and Stanley (as cited by Benge et al., 2012) identified eight major threats to internal validity: testing, maturation, history, instrumentation, mortality, interaction effects, statistical regression, and the differential selection of participants. These threats would, however, apply to a quasi-experimental research designs and designs that use control and treatment groups (Creswell, 2014). Because I used a quantitative multivariate logistic regression design, these threats did not apply to this study of the relationship between neighborhood-level factors and childhood obesity.

Construct Validity and Statistical Conclusion Validity

According to Guo, Logan, Glueck, and Muller (2013), construct validity is the extent to which a measure or manipulation tests what it purports to measure. While external validity is based on the general aspects of research findings, construct validity explains the strength of the results (Creswell, 2014). The threats to construct validity I faced in this study involved the effectiveness of operationalization and how the measures were reflected in the study. Also, the manner in which the claims are strengthened could be a threat to construct validity. To demonstrate construct validity, I used only relevant and the most current existing research findings to discuss the results of this study. Although mostly ignored, statistical conclusion validity is the most important validity due to its relevance whenever researchers make decisions regarding the presence of relationships between different variables. According to García-Pérez (2012), statistical conclusion validity refers to the extent to which the conclusions that are arrived at by the researcher are credible. Thus, threats to conclusion validity involve factors that could lead a researcher to make inaccurate conclusions regarding the relationships between variables (García-Pérez, 2012). Researchers can make errors about relationships if they confirm the existence of a relationship when in reality there is none or when they report the absence of a relationship when, in fact, there exists a relationship (Yilmaz, 2013). In this study, I used chi-square tests and multivariate logistic regression analysis to evaluate the relationships between the children's BMI (the dependent variable) and neighborhood safety, parental educational level, and presence of parks, playground, or open space (as independent variables).

A few studies have used CHIS data in the past and demonstrated statistical conclusion validity (Becerra, Herring, Marshak, & Banta, 2014; Melius, 2013). Melius (2013) examined the factors determining obesity and overweight among children, using CHIS data. In that study, data belonging to children from racial and ethnic minorities indicated a strong statistical relationship between obesity or overweight and poverty, ethnicity, and race (Melius, 2013). The findings of the study supported the statistical conclusion validity due to strong relationships between race/ethnicity and childhood obesity. A recent study by Becerra et al. (2014) used CHIS data from the years 2007, 2009, and 2009 to examine the association between fast-food consumption and generational status among South-Asian Americans. The findings of the study indicated the presence of a relationship between fast-food intake and generational status (Becerra et al., 2014). The findings of these studies were reliable and supported the use of CHIS data in obesity research.

Ethical Procedures

Before initiating this study, I sought approval from the IRB of Walden University and was provided with an IRB approval number (see Appendix A). The IRB of Walden University played a major role in ensuring that research ethics were adhered to throughout the research process. The IRB watches over the protection of human participants and reviews research plans to ascertain that participants are not exposed to unreasonable risk. However, because I used archival data, I had no direct contact with participants. Thus, informed consent was not applicable. However, I sent an e-mail to the UCLA-CHPR, seeking approval to use the CHIS 2009-2014 data sets to assess the impact

of neighborhood factors on childhood obesity among African-American children, aged 5-11 years and living in California. The UCLA-CHPR provided the services for analysis of the CHIS data using a secure platform that protects the respondents' confidentiality through the DAC database (CHIS, 2016b). After getting approval from UCLA (see Appendix B), I downloaded the secondary data from the PUFs page on the UCLA-CHPR database in SPSS format and stored them in my personal computer for statistical analysis.

Summary

In this chapter, I provided a comprehensive discussion of the research design and rationale for choosing this approach, the research methods used, threats to validity, and applicable ethical procedures. The chapter also presented the data access and data collection and data analysis procedures. The purpose of this study was to evaluate the relationship between neighborhood-level predictors and obesity among African-American Children, aged 5-11 years, from the state of California. I employed a quantitative multivariate logistic regression design to test the hypotheses in an effort to answer the three research questions posed for the study. In this study, I used secondary data from the CHIS 2009-2014 surveys for statistical analysis after obtaining approval and following the requisite ethical procedures. The Children's BMI was used as the dependent variable, while the independent variables were neighborhood safety, neighborhood support, and presence of parks, playgrounds, or open space, while adjusting for other variables.

I utilized the SPSS-22 software to conduct the statistical analysis and obtain descriptive and inferential statistics. I used descriptive statistics to discuss the

demographic characteristics of the sample. Multivariate logistic regression facilitated the examination of the relationships between the dependent (BMI) and independent variables. This study involved three hypotheses that were tested at a 5% confidence interval and 0.05 level of significance. In the next chapter, I provide a description of the statistical analysis and the results. A discussion and interpretation of the findings are provided in Chapter 5 as well as an explanation of the limitations of the study and its implications for positive social change. I also offer recommendations for practical application and future research on this topic.

Chapter 4: Results

Introduction

The purpose of this quantitative project was to assess the relationship between neighborhood-level factors and obesity among African-American children, aged 5-11 years, from California. The dependent variable, body mass index (BMI), was calculated by dividing the children's weight in kilograms (kg) by their height in meters squared (m^2). The neighborhood-level factors were examined based on neighborhood safety, neighborhood park/playground/open-space safety, physical activity, parents' highest level of education, neighborhood built environment, neighborhood support, and neighborhood walkability. The data for statistical analysis were retrieved from the California Health Interview Survey (CHIS) database, a state health survey that is used for collecting data on children, adolescents, and adult individuals in California. Specifically, this quantitative research project involved the use of the CHIS 2009, 2011-2012, and 2013- 2014 data sets. The statistical analysis was guided by three research questions (RQs) and associated null and alternate hypotheses:

- RQ1: What is the association between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
    - *Null Hypothesis (H_0)*: After adjusting for all variables, there will be no association between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California.

- *Alternative Hypothesis (Ha)*: After adjusting for all other variables, a statistically significant association exists between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California.

- RQ2: What is the association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
  - *Ho2*: After adjusting for all other variables, there will be no association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California.
  - *Ha2*: After adjusting for all other variables, a statistically significant association exists between neighborhood support and BMI among African-American children, aged 5-11 years, living in California.
- RQ3: What is the association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables?
  - *Ho3*: After adjusting for all other variables, there will be no association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 year, living in California.
  - *Ha3*: After adjusting for all other variables, a statistically significant association exists between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 year, living in California.

Statistical analyses were conducted with the use of multivariate logistic regression to identify the relationship between childhood obesity and neighborhood-level factors at the $\alpha = 0.05$ level of significance. In this chapter, I present the research questions and associated hypotheses, data collection and data analysis procedures, and findings. The results of this project are presented in the form of descriptive statistics, tables, figures, and inferential statistics. First, the descriptive statistics of the sample are presented, followed by the results of the logistic regression analyses that were performed to test the hypotheses. A comprehensive summary of the chapter is also provided. The chapter is organized into three main sections: data collection, results, and summary.

Data Collection

Instrumentation

This project employed secondary data from the CHIS database for the years 2009-2014. The first cycle of CHIS surveys from 2001 to 2009 was conducted over a 7-to-9-months period annually (CHIS, 2014). However, from 2011 onward, data were collected biennially to eliminate the likelihood of seasonality, which is common in biennial data, and to facilitate more timely and frequent tracking and release of data (CHIS, 2014). The CHIS 2009 survey data were collected from September 2009 to April 2010 (CHIS, 2012a). For the CHIS 2013-2014 survey, data collection was conducted between February 2013 and January 2015 (CHIS, 2014). The CHIS data involved a randomized sample of children, aged 5-11 years and living in California. I specifically used the PUF data files for CHIS 2009, 2011-2012, and 2013-2014 for this project. The UCLA Center for Health Policy Research (UCLA-CHPR) had contracted Westat, a private research

firm, to carry out the CHIS surveys. Through computer-assisted telephone interviewing (CATI) technology, the Westat staff interviewed adults, children, and adolescents on health issues using random digit dialing (RDD) samples, which contained both cellular and landline telephone numbers (CHIS, 2012a). However, various discrepancies could face data collection using RDD samples (CHIS, 2014). The two primary threats to RDD sampling are noncoverage and nonresponse (CHIS, 2012b). Noncoverage is caused by exclusive cell phone use, while nonresponse results from declining response rates in the CHIS surveys (CHIS, 2016a). The use of survey statistics derived from landline phones-only may lead to misinterpretation of health statistics because of noncoverage of households with cell phones-only (CHIS, 2012b). Young Whites families living in urban areas tended to use cell phones only for communication (CHIS, 2016a). This population contained crucial health information that may influence research outcomes. Thus, failure to sample such populations may cause misinterpretation of health data (CHIS, 2012b). The UCLA-CHPR has resorted to multiple sampling frames for both landline and cell phone users. This process too affects the complexity of statistical weighing procedures (CHIS, 2016a). The CHIS surveys have also encountered problems arising from nonresponse, with the response rates constantly declining since 2001, despite efforts to halt the trend (CHIS, 2012b). As a result, there is a high likelihood of nonresponse bias if the nonrespondents have systematically different health indicators from the respondents (CHIS, 2012b).

The inclusion criteria for the CHIS 2009-2014 surveys were dependent on the participants' having an address and telephone number within California. Data collection

was performed in 44 geographical regions, including all of California's 58 counties (CHIS, 2014). Regarding the data that were used in this quantitative project, Westat called and interviewed random adults from each selected household and sampled one child if the adult was the parent or legal guardian of the child (CHIS, 2016a). Up to three interviews could have been conducted for each household (i.e., adult, child, and adolescent; CHIS, 2014). The interviews were conducted using five languages: English, Spanish, Chinese, Vietnamese, and Korean, using the Westat CATI system (CHIS, 2016a). The interviews took approximately 35 minutes to complete by adults, while the children and adolescents were interviewed for approximately 17.5 and 20 minutes, respectively (CHIS, 2016a). However, an additional 9 minutes were used when additional household information was sought in the child-first interviews (CHIS, 2014). After agreeing to participate in the CHIS surveys, the participants were asked questions based on the individual questionnaires for each CHIS year. The major topics in the CHIS questionnaires were demographics, race, income, housing characteristics, food security, diet, playground or park use, neighborhood safety, neighborhood walkability, and the education level of parents or guardians (CHIS, 2014).

In this project, I specifically used data for African-American children, aged 5-11 years and living in California. Data analysis was based on the CHIS survey data sets for the years 2009, 2011, 2012, 2013, and 2014. Data from the CHIS-CHPR database were downloaded and exported to the SPSS-22 software for statistical analysis. I chose the SPSS for statistical analysis in this project because of its data management tools, graphical display options, and ability to evaluate a wide variety of models. There are

various advantages to using the data from the CHIS-CHPR database. First, CHIS data sets were comprehensive and were compiled ready for analysis (CHIS, 2012a). The CHIS 2009-2014 surveys had high completion rates mainly due to the adequate training of survey staff on data collection steps. The reliability and validity of CHIS data have also been documented in previous research (Brown et al., 2013). The methods employed in data collection in the CHIS survey provided reliable and valid data for researchers (CHIS, 2014). However, CHIS surveys usually depend on respondents' feedback on weight and height; thus, they could cause underestimation of the prevalence of childhood obesity among Californians (CHIS, 2014). According to the CHIS (2016a), the accuracy of CHIS data was dependent on the strength of the respondents' memorizing skills and variations in the measurements collected by survey staff.

Demographics

The demographic characteristics of the sample in this project were presented by describing the distribution of African-American children living in California based on the CHIS surveys. The total sample size of African-American children, aged 5-11 years, living in California from 2009 to 2014 was n = 1,049. Table 1 presents the total response rates of the CHIS surveys from 2009 to 2014.

Table 2

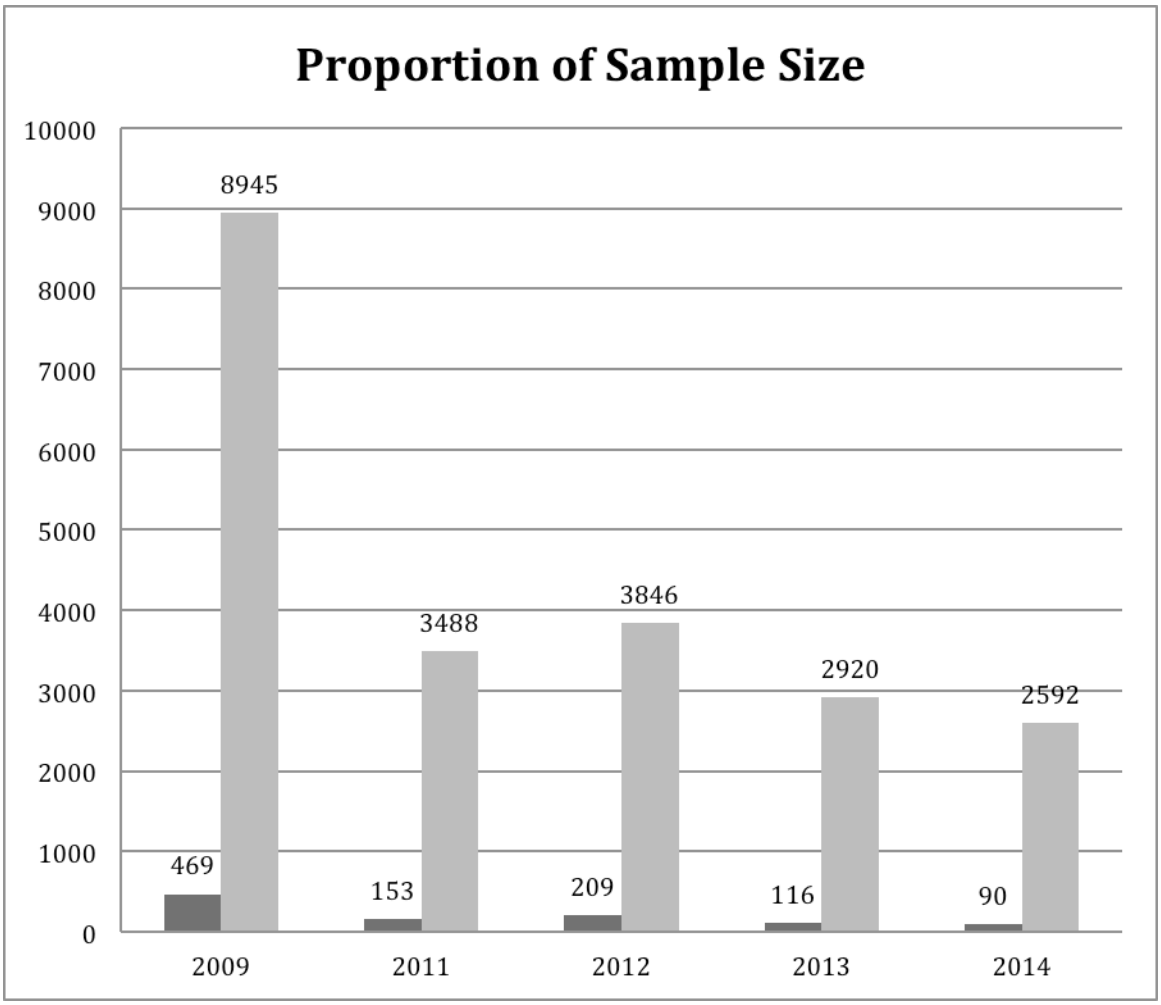
Response Rates by CHIS Year

CHIS Year	*n*	*N*	Percentage
2009	469	8,945	5.2%
2011	153	3,488	4.4%
2012	209	3,846	5.4%
2013	128	2,920	4.3%
2014	90	2,592	3.5%
Total	1,049	21,791	

Note. CHIS = California Health Interview Survey. *n* = Sample size. *N* = Child participants.

As indicated in Table 2, the CHIS 2009 had the highest number of child participants (*N* = 8,945), with CHIS 2011, CHIS 2012, CHIS 2013, and CHIS 2014 having a total of 3,488; 3,846; 2,920; and 2,592 participants, respectively. CHIS 2009 (5.2%, *n* = 469) also had the largest sample size based on percentage (6.6%, *n* = 209), followed by CHIS 2012 (5.4%, *n* = 209), CHIS 2011(4.4%, *n* = 153), CHIS 2013 (4.3%, *n* = 128), and CHIS 2014 (3.5%, *n* = 90), respectively. Figure 4 shows a graphical representation of the sample sizes of African-American children in relation to the total response rate.

Figure 4. Sample size versus total response rates from 2009 to 2014.



Results

Descriptive Statistics

Most of the participants in the CHIS 2009 (39.9%), CHIS 2011 (45.1%), CHIS 2012 (38.8%), CHIS 2013 (36.7%), and CHIS 2014 (34.4%) reported feeling safe in their neighborhoods all of the time. Correspondingly, the percenatge of participants who did not feel safe in their neighborhood all of the time was less than 5% in the CHIS 2009-2014 data set. Over half of the participants in the sample agreed that adults in their neighborhoods could be trusted to look out for children: CHIS 2009 (55.4%), CHIS 2011

(52.9%), CHIS 2012 (55%), CHIS 2013 (56.3%), and CHIS (63.3%). The majority of the participants indicated that a park, playground, or open space was present within walking distance of their home: CHIS 2009 (82.5%), CHIS 2011 (81%), CHIS 2012 (82.8%), CHIS 2013 (86.7%), and CHIS 2014 (81.1%). The largest percentage of the participants in the CHIS 2009-2014 surveys had not walked from school to home: CHIS 2009 (36.9%), CHIS 2011 (45.1%), CHIS 2012 (44.5%), CHIS 2013 (39.1%), and CHIS 2014 (45.6%). Over 50% of the participants had at least a high school diploma. A higher percentage of participants had engaged in at least 1 hour of physical activity for 7 days in the precedingt week.

Statistical Assumptions

This project employed a quantitative design to assess the impact of neighborhood-level factors on obesity among African-American children, aged 5-11 years. Quantitative research was the design of choice for this project because of the variables' levels of measurement, the existing variations in the variables, and the need to determine the extent of the relationship between childhood obesity and neighborhood-level factors. A multivariate logistic regression design was best suited for this quantitative project as it facilitated the evaluation of the association between neighborhood-level factors and obesity among African-American children. This quantitative project was executed after considering three assumptions regarding logistic regression: dichotomous dependent variables, continuous or categorical independent variables, and mutually exclusive observations (Harrell, 2015). I chose logistic regression because the dependent variable

was binary, and the independent variables were categorical with mutually exclusive groups.

Results of the Logistic Regression

The aim of conducting the multivariate logistic regression analysis was better to understand the relationship between childhood obesity and key neighborhood-level variables, including safety, walkability, support, and built environment. Based on the multivariate logistic regression model, only physical activity significantly predicted childhood obesity ($p < 0.033$). Parental educational level ($p < 0.842$), presence of parks, playground, or open spaces ($p < 0.595$), neighborhood walkability ($p < 0.374$), neighborhood safety ($p < 0.094$), neighborhood support ($p <0.509$), and gender ($p < 0.617$) did not significantly predict childhood obesity. Table 3 presents a summary of the first step of the logistic regression model. Table 4 shows the final regression model containing only physical activity, gender, and childhood obesity.

Table 3

Multivariate Logistic Regression Results

Variables of Step 1[a]	*B*	*SE*	Wald	*Df*	*p*	Exp(*B*)	95% CI Lower limit	95% CI Upper limit
Physical activity	0.086	0.040	4.528	1	0.033	1.090	1.007	1.180
Education level			4.906	9	0.842			
Park(1)	0.162	0.305	0.283	1	0.595	1.176	0.647	2.140
Walkability	-0.041	0.046	0.791	1	0.374	0.960	0.878	1.050
Support			3.302	4	0.509			
Safety			6.404	3	0.094			
Gender(1)	0.092	0.184	0.251	1	0.617	1.090	1.007	1.180
Constant	-1.397	1.382	1.021	1	0.312	0.247		

Note. CI = Confidence interval.

Table 4

Final Logistic Regression Model for Childhood Obesity, Physical Activity, and Gender

Variables of Step 1	*B*	*SE*	Wald	*df*	*p*	Exp(*B*)	95% CI for EXP(*B*) Lower limit	Upper limit
Gender(1)	0.098	0.179	0.301	1	0.583	1.103	0.777	1.567
Physical activity	0.085	0.039	4.636	1	0.031	1.088	1.008	1.567
Constant	-1.138	0.213	28.486	1	0.000	0.321		

Note. CI = Confidence interval.

The final logistic regression model was:

Obesity = -1.138 + 0.085 Physical Activity + 0.098 Gender

Based on the final regression model, only physical activity was significantly associated with childhood obesity ($p < 0.031$), odds ratio (*OR*) = 1.088. The regression model implied that the risk of obesity decreases with every additional increase in the number of days the children engaged in at least 1 hour of physical activity over the past week. The *ORs* indicated that males were 1.103 times more likely to develop obesity, compared to females.

RQ1 asked: What is the association between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables? The alternative hypothesis implied that an association existed between neighborhood safety and BMI among children, aged 5-11 years, in California, after adjusting for all other variables. This section provides the results of the logistic regression that was conducted to determine whether a significant association existed between neighborhood safety and childhood obesity at the $\alpha = 0.05$ level of significance. The Wald test was used to test the effects of each individual predictor, while adjusting for

other predictors. After adjusting for neighborhood built environment, support, walkability, age, and parental educational level, there was no significant relationship in evidence between neighborhood safety and childhood obesity ($p < 0.094$). Thus, the null hypothesis had to be accepted, indicating that neighborhood safety was not a significant predictor for obesity among African-American children, aged 5-11 years, in California.

RQ2 asked: What is the association between neighborhood support and BMI among African-American children, aged 5-11? The alternative hypothesis implied that a significant relationship existed between living in a supportive neighborhood and BMI among African-American children, aged 5-11 years, in California, after controlling for all other variables. Logistic regression analysis was conducted to assess the relationship between childhood obesity and the presence of adults who could be trusted to look out for children in the neighborhood at the $\alpha = 0.05$ level of significance. After controlling for neighborhood built environment, walkability, safety, age, and parental educational level, neighborhood support did not significantly predict childhood obesity ($p < 0.509$). Thus, the null hypothesis had to be accepted, indicating that the presence of adults who would look out for children in the neighborhood did not influence childhood obesity among African-American children in California.

RQ3 asked: What is the association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables? The alternative hypothesis stated that a significant relationship existed between the presence of a park, playground, or open space within 30-minutes walking distance and BMI among African-American children, aged 5-

11 years, in California, after controlling for all other variables. Logistic regression was conducted to answer RQ3. After controlling for neighborhood walkability, age, parental educational level, and safety, no significant relationship was in evidence between the presence of parks, playgrounds, or open spaces in the neighborhood and childhood obesity ($p < 0.595$). This finding suggested that neighborhood built environment could not significantly predict childhood obesity among African-American children in California.

Summary

The purpose of this quantitative research project was to assess the impact of neighborhood-level factors on obesity among African-American children, aged 5-11 years, in California. This project employed secondary data from UCLA-CHPR for the CHIS surveys from 2009 to 2013-2014. The response rates for each survey based on years were CHIS 2009 ($N = 8,945$), CHIS 2011($N = 3,488$), CHIS 2012 ($N = 3,846$), CHIS 2013 ($N = 2,920$), and CHIS 2014 ($N = 2,592$). The sample sizes for the respective CHIS surveys based on years were CHIS 2009 ($n = 469$), CHIS 2011 ($n = 153$), CHIS 2012 ($n = 209$), CHIS 2013 (128), and CHIS 2014 ($n = 90$). The CHIS database containing PUF data files is freely available to the public for downloading. After obtaining approval from the IRB of Walden University, I contacted UCLA-CHPR through e-mail for authorization to use the CHIS surveys in this project. After obtaining approval (see Appendices A and B), I downloaded secondary data from the UCLA-CHPR PUF database and stored them in my personal database. Specifically, the CHIS data sets for 2009, 2011-2012, and 2013-2014 were used in this project. I, then, exported

the data to the SPSS-22 software for statistical analysis. I conducted the BMI calculations based on self-reported weight and height and classified them as either obese or nonobese, based on the CDC's BMI-for-age percentile growth charts for children aged 2-20 years.

I calculated descriptive statistics to provide an overview of the sample of African-American children in California. I conducted multivariate logistic regression analysis to answer the three research questions posed for the study, which guided the exploration of any association between childhood obesity and neighborhood-level factors, including neighborhood safety, neighborhood support, physical activity, and built environments. Based on the results of this project, over one quarter of the obese children lived in neighborhoods that were safe most of the time or all of the time. Most of the parents interviewed had BA or BS degrees, some college education, or a high school diploma. The majority of parents for nonobese children had a BA or BS degree, some college education, or a high school diploma. By contrast, about half of parents with obese children had high school diplomas or some college education. Based on the logistic regression model, there was no significant association between childhood obesity and neighborhood safety; neighborhood support; and the presence of parks, playgrounds, or open spaces in the neighborhood. Only physical activity was found to be significantly associated with the risk of obesity among African-American children, aged 5-11 years.

In the next chapter, I provide in-depth interpretations of the findings of this project with reference to previously published literature. I also discuss the limitations of the study and implications for positive social change. I offer recommendations for practical application and further research on this topic.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this cross-sectional quantitative study was to assess the relationship between neighborhood-level predictors and obesity among African-American children, aged 5-11 years, in California. I utilized a quantitative research design based on secondary data, collected by the CHIS surveys for the years 2009-2015. Specifically, this study was aimed at gaining a better understanding of the potential impact neighborhood support, built environments, walkability, and safety may exert on childhood obesity. Multivariate logistic regression was used to determine the relationship between neighborhood-level factors, including neighborhood support, safety, walkability, and built environments and childhood obesity among African-American children, aged 5-11 years, in California. The rationale of conducting this study was to determine whether neighborhood-level predictors could influence African-American children's BMI and their risk of developing obesity.

In this chapter, I provide a discussion of the data analysis as presented in Chapter 4 and make connections between the findings of this study and those of previous research, reviewed in Chapter 2. This chapter is divided into six main sections: a summary of key findings, interpretations of the findings, limitations of the study, recommendations for action, implications for social change, and conclusions.

Summary of Key Findings

The analysis with the logistic regression model disclosed no significant associations between childhood obesity and neighborhood safety ($p < 0.094$); parental

educational level ($p < 0.842$); presence of parks, playgrounds, or open spaces ($p < 0.595$); neighborhood walkability *(*$p < 0.374$); neighborhood safety ($p < 0.094$); neighborhood support ($p < 0.509$); and gender ($p < 0.617$). Not surprisingly, physical activity levels among the participants emerged as a significant risk factor for childhood obesity among African-American children, aged 5-11 years, in California ($p < 0.033$).

Interpretation of the Findings

Research Question 1

RQ1 asked: What is the association between neighborhood safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables? The logistic regression analysis indicated that neighborhood safety was not significantly associated with obesity among African-American children in California ($p < 0.314$). Neighborhood safety is one of the most important components of any community in the United States. Therefore, when compared to children from secure neighborhoods, children living in unsafe communities seemed to engage in fewer physical activities such as cycling and walking (Ding et al. 2011). Combined with the current rate of sedentary lifestyles among African Americans, reduced physical activity levels could seriously increase children's risks for obesity. Thus, it was important to understand how neighborhood safety affected the BMI and risk of obesity among these high-risk children. Although research on the impact of neighborhood-level factors on childhood obesity is limited, a number of studies have indicated that neighborhood safety might be a serious risk factor for obesity among children (Brockman et al., 2011; Li et al., 2013; Tandon et al., 2012). Brockman et al. (2011) found that neighborhood safety

significantly influenced the amount of physical activity and exercise of children, adolescents, and adults. Consequently, an insufficient amount of physical activity could increase the likelihood of developing obesity among children. Rech et al. (2012) also found that physical activity among individuals was likely to result from their perceptions of neighborhood safety. Li, Barnett, Goodman, Wasserman, and Kemper (2013) found that lower levels of perceived neighborhood safety could reduce physical activity levels and increase the risk of obesity among children. Based on Li et al. (2013), parents living in crime- and violence-infested neighborhoods are less likely to allow their children to engage in physical activities out of doors, which increased their risk of obesity. In their study, Tandon et al. (2012) found that neighborhood safety was a significant determinant of physical activity behaviors in children. According to Tandon et al. (2012), secure neighborhoods have a lower prevalence of childhood obesity, compared to locations with high rates of crime and violence. However, Brussoni, Olsen, Pike, and Sleet (2012) claimed that, unlike in adults, the association between neighborhood safety and obesity among children was inconclusive. The findings of this study are congruent with those of Amorim, Hallal, and Azevedo (2010), who reported inconsistent and inadequate support for the association between neighborhood safety and leisure-time physical activity.

Research Question 2

RQ2 asked: What is the association between neighborhood support and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables? In the present study, I evaluated the influence of parents' perceptions of neighborhood support on their children's likelihood of developing obesity.

Specifically, I examined whether the adults in the neighborhood could be trusted to look out for children. After accounting for neighborhood walkability, built environments, parental education level, neighborhood safety, and age, no association was found between neighborhood support and childhood obesity ($p < 0.515$). In the present study, a supportive neighborhood was one where parents could trust other adults to look out for their children. Based on the responses, the majority of the parents in California perceived that adults in the neighborhood could be trusted to look out for children. However, the logistic regression analysis did not show any significant association between neighborhood support and childhood obesity.

The findings of the present study were inconsistent with those discussed in Chapter 2, which indicated that parents who perceived that their children were safe and protected while outside their home were more willing to allow them to engage in leisure-time physical activity. Past studies have found contrasting results, indicating the presence of a positive association between childhood obesity and a supportive neighborhood environment (Borrell et al., 2016; Herzer et al., 2011). Based on Borrell et al. (2016), perceived levels of social support in a neighborhood can significantly influence children's engagement in physical activity behaviors, hence affecting their risk of obesity. Borrell et al. explained that neighborhood support was associated with neighborhood safety, thus could affect parents' willingness to allow their children to engage in physical activity out of doors. After controlling for the effects of gender, race, poverty level, age, asthma, sedentary activity, physical activity levels, and parental education, Borrell et al. found that children in nonsupportive neighborhoods have a 20%

higher risk of obesity, compared to those living in supportive regions. Herzer et al. (2011) also found a significant association between childhood obesity and perceived social support. Herzer et al. concluded that parental and teacher support influenced BMI among youths, thus influencing their risk of obesity. Waters et al. (2011) also found that social support affected the level of physical activity among individuals from different populations. However, with respect to children, parents are the most important source of support in regard to physical activity. Thus, previous literature indicated that parents in supportive neighborhoods are more likely to encourage their children to engage in physical activity, compared to parents living in unsupportive neighborhoods.

Rezapour, Mostafavi, and Khalkhali (2016) identified the Health Belief Model (HBM) as one of the behavior change theories that is vastly used by public health professionals for comprehending and explaining reasons for health behavior changes. The goal of the HBM is to create educational interventions that tailored toward those identified health behaviors that prevent individuals from maintaining healthy practices. Public health practitioners recognize the HBM as health-specific social cognition model with key areas like perceived benefits (PBE), self-efficacy (SE), perceived susceptibility (PSU), perceived severity (PSE), and perceived barriers (PBA). Based on this model, behavioral interventions for preventing childhood obesity should focus on the understanding that physical activity is an important strategy in the control and maintaining normal body weight. Additionally, the use of both behavioral modifications and public education can reinforce awareness on the health benefits of increasing and maintaining routine physical activities, identify strategies for eliminating obstacles and

negative approaches on physical activity, and increasing routine physical activity levels among individuals (Rezapour et al. 2016). Fuemmeler et al. (2011) also discussed that the relationships children develop within a neighborhood influence their physical activity behaviors and weight status, which in turn determine their risk of developing obesity. In relation to the present study, I hypothesized that the presence of adults who can be trusted to look out for children would encourage parents to allow children to engage in physical activity due to the increased perception of safety. As a result, the children would achieve a healthy weight status and experience a reduced risk of obesity.

Research Question 3

RQ3 asked: What is the association between neighborhood park/playground/open space safety and BMI among African-American children, aged 5-11 years, living in California, when adjusting for all other variables? The changes in built environments have led to the rise in the number of restaurants and fast-food joints and decreased space for sidewalks, parks, and recreational facilities in neighborhoods (Roberts et al., 2015). These structures significantly influenced children's physical activity behaviors, thus affecting their risk of obesity (Sallis et al., 2012). Neighborhood built environments were expected to yield a positive association with childhood obesity. However, the findings of the present study yielded only an insignificant relationship between childhood obesity and neighborhood built environments. Based on the logistic regression analysis, there was no significant association between neighborhood built environment and childhood obesity ($p < 0.764$). In the present study, I evaluated how the accessibility of neighborhood parks, playgrounds, and open-spaces influenced the risk of obesity among

African-American children in California. The findings of the current study diverged from those of previous research on the subject of neighborhood built environments as a risk factor for childhood obesity.

The built environment in a specific neighborhood includes social and physical factors that shape the structure of community life in that location (Casey et al., 2014). In addition, the built environment involves the manner in which a neighborhood is designed, the presence of schools, parks, walking paths, and neighborhood safety (Fuemmeler et al., 2011). Various researchers have found that neighborhood built environments influence children's risk of developing obesity (Carroll-Scott et al., 2015; Casey et al., 2014; Mehtälä et al., 2014; Sandy et al., 2013).

Mehtälä et al. (2014) stated that various environmental structures could influence children's physical activity levels, thus affecting their risk of obesity. Mehtälä et al. found that neighborhood walkability, neighborhood safety, and the availability of recreational facilities significantly influenced physical activity levels among children. Based on Mehtälä et al., children's physical activity levels can also be influenced by population density, housing, and the presence of open or public spaces in the neighborhood. These findings from the aforementioned studies were supported by Sandy, Tchernis, Wilson, Liu, and Zhou (2013), who corroborated that street connectivity and land use affect neighborhood walkability, which in turn influences children's physical activity levels.

Casey et al. (2014) also found a positive relationship between childhood obesity and the presence of parks, restaurants, and food outlets. In their study, Casey et al. utilized the ELIANE framework to gain a better understanding of the relationship

between obesity and spatial measurements in built environments. Based on Casey et al., spatial accessibility and neighborhood walkability were strongly associated with weight status among children. Thus, children from neighborhoods with adequate spatial measurements and walkability were less likely to develop obesity because these environments encouraged physical activity behaviors. Carroll-Scott et al. (2015) also found that a significant relationship existed between the presence of schools and neighborhood environments and obesity among preadolescent children. Based on their findings, Carroll-Scott et al. discussed that school connectedness positively influenced children's BMI and their risk of obesity. However, Carroll-Scott et al. pointed out that the relationship between school connectedness and childhood obesity was stronger in high-income neighborhoods.

Physical activity, parental education, and walkability. Other factors addressed in the present study included physical activity, parental educational level, and gender. Physical activity proved to be a significant risk factor for obesity among African-American children in California. As discussed in Chapter 2, the amount of physical activity among children influenced their risk of obesity. In the present study, I evaluated whether the number of days children engaged in at least 1 hour of physical activity affected their likelihood of obesity. Based on the logistic regression analysis, there was a significant relationship between obesity and the number of days in which the children participated in 60 minutes of physical activity ($p < 0.033$). Thus, children who engaged in physical activity more frequently were less likely to develop obesity. By contrast, children who did not at all or only rarely engage in physical activities had a higher

likelihood of developing obesity. The findings of the present study suggested that lack of physical activity was the primary risk factor for childhood obesity. Previous researchers also found that the impact of neighborhood safety, built environments, neighborhood support, and parental education on childhood obesity was based on the influence these factors exerted on the physical activity level of the children (Auchincloss et al., 2013; Casey et al., 2014; Wijtzes et al., 2014).

Based on the logistic regression model, there was no significant association between parental education level and childhood obesity ($p < 0.842$). However, this finding stood in contrast to that of previous research, which consistently indicated a positive association between parental educational level and childhood BMI and obesity risk. For example, Sarrafzadegan et al. (2013) found that, among other factors, parental education played a significant role in children's participation in physical activity behaviors. In addition to increasing knowledge about healthy behaviors and dangers of childhood obesity, the parents' educational level determines their income, thus influencing the availability and choice of food in the household (Baum et al., 2010). Therefore, children whose parents have a high level of education were less likely to develop obesity, compared to those with parents who were illiterate or had low educational levels.

The findings of the present study regarding walkability were not congruent with previous research. Based on the regression model, the association between neighborhood walkability and childhood obesity was not significant ($p < 0.374$). This finding was consistent with that of Hoyt et al. (2014), who found no association between

neighborhood walkability and obesity risk. However, other studies indicated that neighborhood walkability did influence children's physical activity behaviors, thus affecting their risk of obesity (Ding et al., 2011; Duncan et al., 2014; Kimbro et al., 2011). In their study, Duncan et al. (2014) found that neighborhood walkability among other neighborhood-level traits could significantly impact children's physical activity levels. Ding, Sallis, Kerr, Lee, and Rosenberg (2011) mentioned that areas with high concentrations of traffic could inhibit physical activity behaviors and increase the risk of obesity among children. Based on Kimbro et al. (2011), children who lived in more walkable neighborhoods had a lower risk of obesity, compared to those living in crowded localities.

Limitations of the Study

The present study involved the use of relevant secondary data from the CHIS surveys of the years 2009-2014. However, secondary data can affect the reliability of a study due to various limitations (Creswell, 2014). For example, missing and unusual values in secondary data could negatively affect statistical power and influence the sample size, effect size, and confidence interval (Creswell, 2014). As a result, the confidence within which data are interpreted can be significantly affected. To minimize the impact of missing entries and unusual data in the current data set, I could have limited the analysis to a specific number of participants with complete entries. In this manner, I could have avoided a potential Type II error occurs when one accepts a null hypothesis that is actually false (or when one rejects an alternate hypothesis that does not occur due to chance.)

One limitation of the current study was that the CHIS survey responses were based on parents' perceptions regarding their children's behaviors and characteristics, including their weight, height, and race. Research has shown that parent-reported measurements were less accurate, compared to those collected in clinical settings (Brown et al., 2013). However, because this study was conducted at a population level, self-reported measurements were often the only viable option and presented numerous benefits. In this quantitative study, the adults in each households were only interviewed regarding children, aged 5-11 years. The use of self-reporting limited the present study in that the reliability and validity could not be investigated, thus increasing the possibility of bias in the findings (Brown et al., 2013). As a result, the generalizability of the findings of this study to the entire population of African-American children in the United States is limited and should be used with caution. Additionally, self-reported information such as parents' educational attainments are a personal factor; therefore, the participants may have been reluctant to share them candidly.

Another potential limitation of the current study was the unavailability of need-related risk factors of childhood obesity. For example, this study did not address the relationship between childhood obesity and food practices or physical education in the home and school environments or policy-related risk factors. The present study failed to examine other important predictors of the neighborhood environment, including availability of health foods, supermarkets, fast-food restaurants, traffic congestions, and neighborhood grocery stores. The inclusion of these risk factors would have provided a

more comprehensive assessment of the impact of neighborhood-level predictors on childhood obesity among African Americans in California.

Another potential limitation of the present study was the failure to collect the parents' own weight statuses and physical activity levels or those of other children and adolescents in the household. As indicated in past research and focus groups, parents' prior experiences and physical activity behaviors can inform their decision to encourage children to engage in physical activity behaviors (Davison et al., 2013). Thus, comparing the parents' weight status to that of their children would have provided more information regarding the association between parental influence and childhood obesity. Some researchers have also demonstrated that self-reported weight and height of parents can be valid and reliable indicators of childhood obesity, especially when evaluating the relationship (Huybrechts et al., 2014). For example, a comparison of data from the National Health and Nutrition Examination Survey and the National Survey of Children's Health showed a close association between actual and parental reports of childhood obesity, BMI, and overweight estimates (Chung, Perrin, & Skinner, 2013). Finally, the present study involved the use of a logistic regression model that calculated only the likelihood of a child's becoming obese, but not the causes of the condition. The use of a quasi-experimental study design would have provided the opportunity to understand the causal relationships between childhood obesity and neighborhood-level predictors.

Recommendations for Action

This quantitative study has reiterated the existence of a gap in research relating to neighborhood-level predictors of childhood obesity. Childhood obesity is a common

topic of interest in health events among minorities and low-income communities (Auchincloss et al., 2013).

Although there was evidence of a significant association between childhood obesity and physical activity, conducting a primary study using a quasi-experimental research design would have provided more reliable findings (Creswell, 2014).

The neighborhood-level predictors considered in the present study were important factors of the child's social environment. However, these factors were parent-reported or perceived measures; thus, their overall impact on the children's risk of developing obesity may have been underestimated (Brown et al., 2013). Underestimation of risk factors is common when one compares the findings of a study with actual neighborhood measurements, including crime, poverty, unemployment, and income inequality (Singh, Siahpush, & Kogan, 2010). Therefore, future research should be focused on the use of primary and researcher-collected data, as opposed to self-reported survey data to improve reliability.

Because I used unweighted data for data analysis, I would recommend future studies to utilize weighted CHIS data. The findings of the present study may be useful in guiding future research regarding the problem of childhood obesity among African-American children in California. The results of the present study can be disseminated through peer-reviewed journals, and at conferences through research lectures or poster presentations. The results can be utilized in the development of interventions to expand access to health care among low-income and minority populations in the United States.

The present quantitative study offers numerous potential opportunities for future research. In the current study, I evaluated the impacts of neighborhood-level factors on the risk of childhood obesity among African-American children, aged 5-11 years, in California. Current research has provided significant comparative evidence of the prevalence of obesity in low-income communities in the United States (Ogden et al., 2014). However, the findings of the present study were largely inconsistent with previous research findings regarding the association between childhood obesity and neighborhood-level predictors. The findings of the present study provided additional evidence regarding the potential neighborhood-level factors for childhood obesity and highlighted important areas for future research with populations that have been largely overlooked such as African-American and Latino communities.

The data used in this study were also collected using telephone interviews based on the CHIS questionnaire, which raises problems regarding the validity and reliability of the study. According to Creswell (2014), using questionnaires to collect self-reported data can significantly impact the precision and accuracy of the responses, which could have limited the data analysis and interpretation. Therefore, it would be beneficial to apply the findings of this research to obese children who are not under medication so as to facilitate comparisons with those who receive treatment. Assessment of the impact of neighborhood culture on childhood BMI and the risk of obesity could also be an interesting undertaking, especially among the minority groups in the United States.

Implications for Social Change

Addressing the growing problem of childhood obesity in the United States is a challenging prospect. The ever-increasing complexity of the health care sector and difficulties in addressing chronic conditions such as childhood obesity reiterates the necessity of doctorate-prepared nurses (Ogden et al., 2014). In the present study, a significant association was found only between childhood obesity and the children's physical activity levels. There were no significant associations between childhood obesity and neighborhood safety, neighborhood support, neighborhood walkability, built environments, age, and parental educational level. As there is a major gap in the research regarding the association between neighborhood-level predictors and obesity, several implications can be drawn from the results of the present study.

The present study provides a foundation for various social changes and efforts that could be directed toward reversing the trend of childhood obesity among African-American children. In this quantitative study, I evaluated four major predictors of childhood obesity in California. The findings showed that there was a significant association between childhood obesity and physical activity levels. Although most of the neighborhood-level predictors examined were not statistically significant, the present study could lead to positive social change by emphasizing the strong association between physical activity levels and childhood obesity in California. The findings of the present study will contribute to the existing knowledge about childhood obesity and could be used to inform the development of policies to reduce and prevent the condition among minorities. In addition, this study can be utilized to initiate positive social change in

practice by educating parents on the benefits of regular physical activity among African-American children in California. This improved knowledge and awareness would lead to a significant reduction in the rate of childhood obesity in California. Currently, numerous obesity-control and prevention initiatives and policies have been launched in several states and localities (Chriqui, 2013). For instance, the CDC provides funding for 50 state-based initiatives that aim to control and prevent obesity by promoting physical activity and healthy eating practices (CDC, 2016c). California has also introduced a policy requiring counties and cities in the state to ensure that all roads can safely accommodate pedestrians, cyclists, and children (Jacobsen, Racioppi, & Rutter, 2009).

The findings of the present study can also guide the transformation of environments that are known to discourage physical activity behaviors among children through social action and development of health policies at the local and community levels (Kumar & Preetha, 2012). If the local and community-level initiatives promote behavioral change in the children's physical activity levels, similar interventions could be recommended for other states and minority communities. The latest statistics indicate the prevalence of childhood obesity in all the low-SES and ethnic groups and show that children living in all neighborhoods are still below the Healthy People 2010 goal (Wang, Orleans, & Gortmaker, 2012). Therefore, community-based initiatives that aim to transform the built environments and social and physical environments in low-income areas could be effective in reducing the prevalence of childhood obesity among African-American children.

Conclusion

The impact of obesity on young children cannot be underestimated. Therefore, early recognition, evaluation, and prevention are essential to reducing the prevalence of the condition, especially among African-American children and other minorities in the United States. Obese children are predisposed to various health conditions and complications, including heart disease, gall stones, fatty liver disease, hypertension, diabetes, high cholesterol, sleep apnea, and gastrointestinal diseases such as reflux (CDC, 2014; Han et al., 2010; Reifsnider et al., 2010; Spruijt-Metz, 2011). In addition, childhood obesity can also increase the risk of psychological and social problems, including low self-esteem and stigma (CDC, 2014). Most importantly, obese children have a higher likelihood of suffering from obesity in adulthood (Spruijt-Metz, 2011). This quantitative study assessed the impact of neighborhood-level predictors on obesity among African-American children, aged 5-11 years, in California. Three research questions were posed for the study to increase the understanding of the relationship between childhood obesity and four neighborhood-level predictors: neighborhood safety, support, walkability, and built environments. Data analysis was conducted with logistic regressions using secondary data from the CHIS surveys for the years 2009-2014. The findings of the logistic regressions indicated that childhood obesity was mainly associated with lack of physical activity. The association between childhood obesity and parental educational level, neighborhood support, walkability, safety, and age was not statistically significant, yet important with respect to the influence these factors exert on the level of physical activity the children engage in.

The evidence presented in the current study suggests that changes of individual health behavior practices such as maintaining regular physical activities could potentially decrease the rate of obesity among African-American children; thus reducing the inequities across population subgroups and communities. Therefore, based on the results of this study childhood obesity-control and prevention programs should integrate behavioral modification interventions that promote physical activity among children, thus improving their weight status. Such initiatives should also include social policy measures to improve the broad physical and social environments that encourage the development of conditions conducive to obesity prevention among children by putting them into environments that decrease sedentary behaviors and increase physical activity and a healthy diet.

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Appendix A: Walden University IRB Approval

From: Libby R. Munson **Sent:** Tuesday, May 02, 2017 12:24 PM **To:** uche.onyeka@waldenu.edu **Cc:** Katie Callahan-Myrick **Subject:** IRB Materials Approved - Uche Onyeka

Dear Ms. Onyeka,

This email is to notify you that the Institutional Review Board (IRB) confirms that your doctoral capstone entitled, Assessing Impact of Neighborhood-Level Predictors on Obesity among African American Children, meets Walden University's ethical standards. Since this project will serve as a Walden doctoral capstone, the Walden IRB will oversee your capstone data analysis and results reporting. Your IRB approval number is 05-02-17-0262514.

This confirmation is contingent upon your adherence to the exact procedures described in the final version of the documents that have been submitted to IRB@mail.waldenu.edu as of this date. This includes maintaining your current status with the university and the oversight relationship is only

If you need to make any changes to the project staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 10 business days of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB materials, you made a commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained at the IRB section of the Walden website: http://academicguides.waldenu.edu

/researchcenter/orec

You are expected to keep detailed records of your capstone activities for the same period of time you retain the original data. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Institutional Review Board.

Both students and faculty are invited to provide feedback on this IRB experience at the link below:

http://www.surveymonkey.com/s.aspx?sm=qHBJzkJMUx43pZegKlmdiQ_3d_3d

Sincerely, Libby Munson Research Ethics Support Specialist Office of Research Ethics and Compliance Walden University 100 Washington Avenue South, Suite 900 Minneapolis, MN 55401 Email: irb@mail.waldenu.edu Phone: (612) 312-1283 Fax: (626) 605-0472

Information about the Walden University Institutional Review Board, including instructions for application, may be found at this link: http://academicguides.waldenu.edu/researchcenter/orec

Appendix B: Approval Letter from the University of California, Los Angeles (UCLA), Center for Health Policy Research

Uche Onukwugha
Walden University
Doctor of Philosophy PUHB- Epidemiology
July 27, 16

UCLA Center for Health Policy Research
10960 Wilshire Blvd, Suite 1550
Los Angeles, CA 90024.

Dear Sir or Madam,

Re: Authorization to Reproduce California Health Interview Survey (CHIS) Datasets 2007 to 2013 in my Dissertation.

I am a Doctoral student at Walden University. I am in the process of completing my PhD courses in Epidemiology and starting my dissertation program. My research topic is Assessing the Impact of Neighborhood-Level Predictors on Obesity among African American Children 5-11years old living in California. I am sending this email to ask for your permission to access CHIS Datasets for use in my research. Walden University requires that I obtain a written permission before utilizing your organization's Datasets in my research.
I will appreciate your positive response by granting me access to CHIS Datasets for my study. Additionally, I am willing to provide any supporting document(s) you need from me.
Thank you,
Sincerely,
Uche Onyeka

From: **CHPR Data Access Center** <dacchpr@em.ucla.edu>
Date: Wed, Sep 7, 2016 at 1:52 PM
Subject: RE: California Health Interview Survey (CHIS) Datasets 2007 to 2013 in My Dissertation
To: Uche Onukwugha <uche.onukwugha@waldenu.edu>
Cc: CHPR Data Access Center <dacchpr@em.ucla.edu>

Dear Uche,

Thank you for your interest in The California Health Interview Survey (CHIS). CHIS produces Public Use Data files (PUF) in SAS, STATA and SPSS formats for the purpose

of health related research projects. You are welcome to use any of these free products: PUF, AskCHIS, and AskCHIS NE, for your dissertation at Walden University. Please see the following link with instructions on how to correctly cite CHIS data products: http://healthpolicy.ucla.edu/chis/faq/Pages/Citations.aspx.

Based on our previous discussion, we recommend that you use the CHIS PUF datasets for a more in-depth analysis at the state level, and then incorporate AskCHIS to look specifically at the population distributions specific to Solano County.

Please feel free to reach out if you have any additional questions about how to incorporate CHIS data and data its associated data products into your dissertation.

Sincerely,

Holly Hreha
Holly Hreha, MPH
Data Access Center Coordinator
California Health Interview Survey (CHIS)
Email: hollyh@ucla.edu / dacchpr@ucla.edu
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