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Neighborhood and Community Influence on Adolescent Obesity

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This is to certify that the doctoral study by

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Walden University
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Abstract

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by

Peggie Harrison

MPH, Virginia Commonwealth University, 2003

BS, Florida Agricultural and Mechanical University, 2002

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

In the United States, over two-thirds of adults are overweight or obese, and the number of children and adolescents who are overweight is increasing. Obesity is a significant issue as obesity-related chronic diseases can result in diminished quality or life, high morbidity and mortality, and substantial healthcare costs. The purpose of this study was to examine neighborhood social capital and how it relates to adolescent obesity. The socio-ecological model was used as the theoretical framework of this study to examine how the environment and social contexts influence health behaviors. Utilizing a quantitative cross-sectional research design, bivariate and multivariate analyses were conducted on 43864 10 to 17 year-olds using secondary data from the 2011-2012 National Survey of Children's Health. Controlling for age, gender, race, and overall health status, logistic regression analysis indicated that supportive environments predict the odds of adolescent overweight and obesity, while safer communities did not significantly predict the odds of adolescent overweight or obesity. The results of this study showed that there was a significant association between living in a supportive neighborhood and a decreased likelihood of an adolescent being overweight or obese (OR = 0.797). Associations were also found in demographic variables such as race, gender, and age. Positive social change implications from this study may include use of the findings by public health practitioners to better understand the factors that influence adolescent obesity in general, and the role of the social neighborhood environment in particular. In turn, public health workers can use this improved understanding to improve the quality of interventions, programs, and policies, resulting in positive social change among adolescents.

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Section 1: Foundation of the Study and Literature Review

Introduction

The United States is in the midst of an obesity epidemic. Over two-thirds of adults are overweight or obese, and the number of children and youth that are overweight is increasing (Centers for Disease Control and Prevention, 2015). Overweight or obesity occurs when a person has a weight above what is considered normal for their age or height (Centers for Disease Control and Prevention, 2015). In 2011-2012, 8.1% of infants and toddlers had high weight, and 16.9% of 2-19 year-olds were obese (Ogden, Carroll, Kit, & Flegal 2014). This was not a significant change from 2003-2004.

In Section 1, I offer the problem statement and discuss the study's purpose. Then I present the research questions and hypotheses, and discuss theoretical foundations of the study. Finally, I offer a review of scholarly literature, and close by discussing major concepts, assumptions, and limitations of the study.

Problem Statement

Obesity-related chronic disease can result in high morbidity and mortality, decreased quality of life, and increased healthcare costs (Centers for Disease Control and Prevention, 2014). Childhood obesity has been found to be associated with a higher chance of premature death and disability in adulthood (Commission on Ending Childhood Obesity, 2014). Past researchers have demonstrated that overweight children and adolescents are more likely to become obese adults (Singh, 2010). Overweight children and adolescents may experience social discrimination and societal stigmatization (Schwartz, 2003). Additionally, the psychological stress of being overweight can lead to

low self-esteem, which can inhibit social and academic function and continue into adulthood. Economically, obesity-attributable costs start small during childhood and adolescence but grow substantially over the lifetime. Research has shown that present value of the lifetime cost of obesity incurred between the ages of 18 and 75 years approaches $58,000 (E. C. Finkelstein, 2006). Nationally, obesity-attributable medical expenditures are estimated at $75 billion in 2003 dollars (E. A. Finkelstein, 2004).

There is a need to address the factors that affect obesity, and a governmental response would be most effective in making a large-scale change. The U.S. Department of Health and Human Services Healthy People 2020 objectives call for "a reduction in the proportion of children and adolescents who are overweight or obese" (NWS HP2020-5) and "prevent inappropriate weight gain in youth and adults (NWS HP2020-11). The United States has made little progress toward achieving this goal.

Purpose of the Study

The purpose of this study was to examine neighborhood social capital and how it relates to adolescent obesity. Social capital is defined as how social structures including norms, trust, and networks, come together to create collective action for mutual benefit (Lochner, 2003). Social capital includes social cohesion and social support (Kirk, 2010). A neighborhood is considered socially cohesive if neighborhood members work together and protect one another, and socially supportive when its members are supportive of their neighbors. Previous researchers have investigated the role that built environment plays (access to parks, unsafe neighborhoods, etc.) in childhood obesity (Singh, 2010). Comparatively, there are fewer studies looking at the role of neighborhood social

environment. Likewise, social capital has frequently been associated with adolescent high-risk behaviors like substance abuse, violence, and sexual activity (McPherson, 2013), but not thoroughly studied in the context of childhood obesity.

Research Questions

Research Question 1: Are adolescents in supportive neighborhoods less likely to be overweight or obese?

$H_0$1: There is no statistically significant association between adolescents living in a supportive neighborhood and being overweight or obese.

H_A 1: There is a statistically significant association between adolescents living in a supportive neighborhood and being overweight or obese.

Research Question 2: Are adolescents in safer communities less likely to be overweight or obese?

$H_0$2: There is no statistically significant association between adolescents living in safer communities and being overweight or obese.

H_A 2: There is a statistically significant association between adolescents living in safer communities and being overweight or obese.

I designed these research questions to better understand the issue of how environmental factors play a role in adolescent obesity. The hypothesis is that adolescents with neighborhood support and those living in safer communities will have better health and will be less likely to be overweight. This research is beneficial in that public health stakeholders can use the findings to develop interventions that address this issue. In addition, this study fills the current gap in the scholarly literature on adolescent obesity.

Theoretical Foundation: The Social Ecological Model

Given that adolescents were the specific focus in my study, it is imperative to describe the social and cultural context surrounding the adolescents participating in this study to fully identify the challenges they face. In general, adolescence is a time of transitions. Youth are developing their identities, becoming more independent from their parents, and connecting more with friends and communities. Adolescents are influenced by cultural, political, and economic contexts along with the social dynamics of the neighborhoods in which they live (Raphael, 2013). More specifically, child and adolescent outcomes can be influenced by the accessibility and quality of organizational resources in neighborhoods and communities.

For this study, I used the social-ecological model as the theoretical foundation to investigate relationships between social capital, collective efficacy, and obesity among adolescents. Ecological models place emphasis on how the environment and social contexts influence health behaviors. Past researchers have found that health interventions that are grounded in ecological theory are effective (McLeroy, 1988). The main premise of the ecological model is that there are multiple levels of influences, and that behavior can be positively changed when the various levels are supportive (Sallis, 2008). Bronfenbrenner (1979) developed the ecological system theory of human development in the 1970s. In the ecological model, Bronfenbrenner (1979) focused attention on environmental causes of behavior and the ability to effect behavior at intrapersonal, interpersonal, organizational, community, and social/political levels.

Intrapersonal-level factors are individual factors such as attitudes, knowledge, behavior, self-concept, skills, and developmental history (McLeroy, 1988). Interpersonal-level factors include formal and informal social networks and social support systems such as families and peer networks. Institutional factors include social organizations that have structured rules and regulations for operation, including schools, churches, clubs, and other institutions where individuals interact and are influenced. At the community level, factors can influence the relationship between organizations, institutions, and other networks within defined boundaries. Public policies include laws and policies at the local, state, and national levels (McLeroy, 1988). The ecological model is based on several assumptions: (a) that appropriate changes in the social environment will produce changes in individuals, (b) that the support of individuals in the population is essential for implementing environmental changes, (c) that multiple levels of factors influence health behavior, and (d) that multiple types of environmental influences affect health behavior (McLeroy, 1988). The more levels impacted by risk factors and the more risk factors an individual is exposed to, the more likely it is that adverse outcomes occur in social, physical, cognitive, and emotional development. Figure 1 is a graphic representation of the five nested levels of the ecological model.

Figure 1. Social-ecological model. (McLeroy, 1988).

Nature of the Study

I used a cross-sectional research design for this study. This quantitative methodology was most appropriate for the particular research questions because I drew secondary data from a national survey. Additionally, the cross-sectional design aligned with my goal of determining if there is an association between the independent and dependent variables (see Frankfort-Nachimas & Nachimas, 2008). One limitation of a cross-sectional design is that data is only taken at one point in time as opposed other designs where multiple testing occurs, such as quasi-experimental and experimental

designs. While limited testing can limit internal validity, weaknesses can be overcome using statistical analyses. However, cross sectional designs cannot be used to determine causality. A second limitation of this design is the lack of control group. Nonetheless, a strength of this research design is that it is less expensive and less time-consuming, which is important for researchers with limited resources.

Literature Search Strategy

There has been a significant amount of research on obesity in general, and adult obesity in particular. However, comparatively less is known about the factors that play a role in adolescent obesity. Much of the current research has been focused on the built environment. It is only recently that researchers have focused on the social determinants of health and the role the social environment can play in health conditions. For the purposes of this study, I review scholarly literature published from 2010-2016. To gather this literature, I used the Walden University Library to access CINAHL and MEDLINE simultaneous search, PubMed, ProQuest Central, and Science Direct. Other resources used include Google Scholar, Highwire, the Centers for Disease Control and Prevention, and the World Health Organization. Search terms used included *adolescent obesity, obesity risk factors, social capital and obesity, physical activity and obesity, age and obesity, social environment and obesity.*

Literature Review Related to Key Variables

Prevalence of Adolescent Obesity

From 2011-2014, the overall prevalence of obesity among youth ages 2-19 years old was 17% (Ogden, Caroll, Kit, & Flegall, 2014). Although there were no gender

differences in prevalence, researchers have repeatedly found health disparities when measuring adolescent obesity especially in different age groups and among various races (Ogden, 2014). Preschool-aged children 2-5 years old have lower rates of obesity (8.9%) as compared to school-aged children, aged 6-11 years old (17.5%), and adolescents, aged 12-19 years old (20.5%). Non-Hispanic Asian youth have the lowest rates of obesity at 8.6%. Non-Hispanic White youth had the next lowest rates at 14.7%. Non-Hispanic Black youth and Hispanic youth had the highest rates (Ogden, 2014).

Predictors of Adolescent Obesity

Obesity's causes are multifactorial in nature. Karnik and Kanekar (2012) found that genetics, environmental, and behavioral factors all play in role in developing obesity. Genetically, parents' heredity and metabolism are influences on childhood obesity. Locations such as the home, neighborhood, school, and community all play a role in influencing a child's activity due to the different environments. Leading a healthy lifestyle including proper nutrition and physical activity can decrease the risk of childhood obesity and other related diseases (Centers for Disease Control and Prevention, 2015). A plethora of factors such as families, schools, communities, churches, governmental agencies, food and beverage corporations, media, and society can all influence adolescent diet and physical activity.

While there have been many studies focused on the relationship between obesity and socioeconomic status, there are limited studies specifically focused on the association between educational attainment and obesity. Cohen et al. (2013) performed a review of 289 studies investigating the relationship between obesity and education. Not only did the

researchers find an association between obesity and educational attainment, but they also found that obesity was modified by gender and the the country's economic development level. In the United States, researchers have found racial and ethnic differences in the prevalence of higher body mass indicies (BMI). Jackson et al. (2013) found that BMI increased at a faster rate from 1997-2008 for Whites than for Blacks. Blacks with higher than high school education had larger BMIs than Whites for both men and women. In addition, Blacks at all educational levels had higher overweight and obesity prevalence than Whites (Jackson et al., 2013).

Influence of Neighborhood Environment

Research has shown that adolescents from disadvantaged urban communities have higher levels of obesity compared to children and youth from communities with greater resources (Black, 2008). Historically, discrimination and residential segregation have had negative impacts on the physical infrastructure, social processes, and economic and population characteristics of those living in communities, resulting in fewer resources and more vulnerability (Kwate, 2008). More specifically, child and adolescent outcomes can be influenced by the accessibility and quality of organizational resources in neighborhoods and communities (Levanthal, 2000). Lee and Cubbin (2002) researched the association between neighborhood context and cardiovascular health behaviors including diet and physical activity among 8,165 youth 12-21 years participating in the 1992 Youth Risk Behavior Survey. Measures of neighborhood context were social disorganization, socioeconomic status, minority concentration, and urbanization. They concluded that greater social disorganization indicates lower social control and

inadequate monitoring of youth. Additionally, low neighborhood SES and high social disorganization independently associated with poor diet, and high neighborhood Hispanic concentration and urbanicity associated with healthier diet. Neighborhood characteristics were not related to physical activity (Lee, 2002).

Using Census data, Boslaugh et al. (2004) conducted a cross-sectional study of 1073 African American and Caucasian adults in St. Louis examining the influence of individual- (neighborhood pleasantness and availability) and neighborhood-level factors on participants' perceptions of neighborhood physical activity opportunities. The data showed that both neighborhood and individual factors were significant predictors of how individuals perceive physical activity opportunities (Boslaugh, 2004). This is important because most interventions focus solely on access to resources, but not changing the perceptions of the individuals.

Mota et al. (2005) conducted research on perceived neighborhood environments and physical activity in adolescents. Using a cross-sectional design, the researchers classified 1123 adolescents into *active* and *non-active* categories and asked the adolescents to complete a questionnaire assessing perceived neighborhood environment. They found differences in perceptions of the neighborhood environment between the active and non-active adolescents, for example the active adolescents agreed with the importance of accessibility to physical activity opportunities (Mota, 2005). The main focus of this study was the structural resources available in the adolescents' neighborhood. More research is needed to determine which social resources influence adolescent health behavior.

Along with social capital, other contextual factors potentially can influence adolescent health such as neighborhood satisfaction, involvement in extracurricular activities (Fredricks, 2006), constructive use of time (Kegler, 2005), and urban sprawl (Ewing, 2006). Most community-oriented theories assume that active participation and empowerment will lead to communities that can better evaluate and solve health and social problems (McLeroy, 1988). Although common in the urban planning literature, only recently has land-use mix emerged as a potential factor influencing health. Land use refers to the distribution of activities across space, including the location and density of different activities such as residential, commercial, business, etc. (Handy, 2002). Frank et al. (2004) found evidence that increased levels of mixed land use and corresponding moderate physical activity are associated with reduced odds of obesity. Researchers have also found that people living in suburban areas were 25% more likely to be obese compared to those living in urban areas (Poortinga, 2006).

There is a developing body of research that lends to the idea that some environments, particularly urban, are more obesity promoting than others. In a study of African American and Caucasian women from a national survey, Ruel and Reither (2010) found that living in a neighborhood with higher socioeconomic disadvantage was associated with higher BMI and marginally reduced racial disparities in BMI.

Levanthal (2000) identified three mechanisms through which neighborhoods may influence youth: institutional resources, relationships, and collective efficacy. Institutional resources take into account the availability, accessibility, affordability, and quality of learning, social, and recreational activities, child care, schools, medical

facilities, and employment opportunities present in the community. Relationships include parental characteristics, support networks available to parents, parental behavior, and the quality and structure of the home environment. Collective efficacy is defined as the extent of social connections in the neighborhood and the degree to which residents monitor the behavior of others in accordance with socially accepted practices with the goal of supervising children and maintaining public order (Levanthal, 2000).

Social capital

Although there are multiple components to social capital, most definitions include attitudinal/cognitive domains such as mutual trust and reciprocity, along with behavioral/structural components including civic involvement, informal socializing, and volunteering (Subramanian, 2002). Kawachi and Berkman postulated that social cohesion is a major element of social capital, and defined it as the absence of social conflict coupled with the presence of mutual trust and strong social bonds (Berkman L. a., 2003). Subramanian, Kim, and Kawachi (2002) found that the role of community social trust in explaining population health achievements and inequalities is contingent on individual perceptions of social trust. A related component of social capital is social support. Social support is especially beneficial to adolescents since they have relatively undeveloped psychological, financial, and educational resources (Corcoran, 1999).

Kim and Kawachi examined several social capital indicators (social trust, informal social interactions, formal group involvement, religious groups involvement, giving and volunteering, diversity of friendship networks, electoral political participation, and non-electoral political participation) at the community and individual levels as a

predictor of self-rated health in a sample of 24, 835 adults. Using multilevel logistic regression models, they found that living in communities with high social capital is significant associated with lower odds of fair/poor health (*OR* = 0.82, 95%CI 0.69-0.98 (Kim, 2006). Freidman and Aral (2001) investigated the relationships between social networks, risk-potential networks, health, and disease. They found that social networks can involve obligations, stress, and regulations by others, and can lead others into high-risk situations and behaviors. Their findings indicated that social networks can spread messages, norms, social support, and influence through a community. Cohen (2004) also looked at the social relationship and health. He found that social support, social integration, and negative interaction are associated with health outcomes, thus showing that social networks can be both positive and negative. More recently, researchers have associated greater levels of social cohesion and social networks with increased self-rated health, increased fruit consumption, and decreased odds of obesity (Mackenbach, et al., 2016).

There is an increasing number of researchers who have proposed that the presence and amount of social capital is vital to the healthy development of youth. This is true in the United States and throughout the world (Marshall, 2014). Difference in social capital between genders sometimes been found because young men and women are treated differently in the organizations and institutions they are associated with (Marshall, 2014). In a cross-sectional analysis of youth in five cities around the world, young women had stronger associations between social capital and self-reported health (Marshall, 2014). Additionally, neighborhood social capital was particularly relevant for both young

women and men and their self-reported health. Novak, Doubova, and Kawachi (2016) also found gender differences in social capital. In a study of 3,428 Croatian high school students, high social capital was related to moderate physical activity in boys and regular overall activity in girls (Novak et al., 2016).

Social capital can be measured at the family level, school level, peer level, and neighborhood level. Family social capital indicates the presence of caring adults at home. School social capital is related to a caring adult or teacher at school. Peer social capital marks the presence of a caring friend, while neighborhood social capital shows the connectedness of individuals to their communities (Marshall, 2014).

Mohnen et al. (2011) conducted a study on 61,235 respondents in 3,273 neighborhoods in the Netherlands to determine the influence of neighborhood social capital on an individual's self-reported health. Neighborhood social capital was measured by questions on contact with direct neighbors, contact with other neighbors, whether neighbors know one another, whether neighbors are friendly to each other, and whether there is a friendly and sociable atmosphere in the neighborhood. The researchers found that neighborhood social capital has a positive association with individual self-rated health, even when physical and socio-economic neighborhood conditions are included in the model. Additionally, they found that people living in urban and suburban areas had a stronger association between neighborhood social capital and health versus those living in rural areas (Mohnen, 2011). This indicates that individuals living in more urban areas may benefit more from social capital, although they may have less social capital to access.

Ransome, Kawachi, and Dean (2017) investigated how social capital could be used in prevention and intervention efforts to address HIV within communities. Utilizing HIV surveillance data from 2004/2006 in Philadelphia, Pennsylvania, they found that higher levels of neighborhood social capital could enable HIV diagnoses sooner, and with it increased rates of HIV care and engagement.

Evans and Kutcher (2011) studied the protective effects of social capital on adolescent smoking and obesity. In a sample of 196 adolescents from upstate New York, they found that youth from more disadvantaged households had higher BMIs than those from more affluent families, but only when social capital was low (Evans & Kutcher, 2011). A Brazilian study of 363 adolescents also showed mixed results of the relationship between social capital and self-rated health (Borges, 2010). Some components of social capital such as trust in others and perceived helpfulness of neighbors were not found to be statistically significant; however, relationships with people of varying social status was positively associated with self-rated health (Borges, 2010).

Social capital may influence health through psychosocial processes, for example social support. Neighbors who trust one another are more likely to provide help and support in time of need (McNeill, 2006). If adolescents believe that their community is invested in them, then they may be less likely to engage in risky behaviors. Youth with adequate support and opportunities from their families, neighborhoods, and communities develop positive youth assets that aid them in avoiding problem behaviors and having a successful transition into adulthood (Kegler, 2005). When residents know the parents and youth in their community, they are more likely to monitor youth behavior and step in

when they observe problem behavior (Sampson, 2002). Although social context influences individuals, individual characteristics influence and form the contexts where the individuals interact. It is possible that young people who perceived themselves as healthy are able to make more connections in their neighborhoods and communities.

Below is a matrix of recent articles that include data sources and methodologies similar to those I used in this study. There have been mixed findings, with some research showing direct or indirect associations between neighborhood factors and obesity (Duke, 2012; Nesbit, 2014; Zhu, 2013) and others showing no differences between different racial groups (Elbel, 2016; Ness, 2012).

Table 1

Literature Review Matrix

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
Parent Perceptions of Neighborhood: Relationships with US Youth Physical Activity and Weight Status Duke, Browosky, 2012	Evaluate the relationship between parent perceptions of neighborhood and youth aerobic physical activity and weight	2007 National Survey of Children's Health used a sample of 64,076 parents of 6–17 year-olds. Logistic regression models were used to determine if social capital, safety, physical condition, resource availability, and youth influenced the likelihood of physical activity and healthy weight.	2/3 of youth were healthy and the mean BMI for 10–17 years old was 21.6. High levels of neighborhood social capital were reported by parents. Perceived neighborhood social capital and resources were significantly associated with healthy weight. Increasing parent perceived neighborhood social capital was associated with 43% greater odds being physically active.	Neighborhood characteristics are significantly associated with youth weight and physical activity outcomes. Constructs for neighborhood context had little overlap. This study demonstrated the importance of assessing multiple aspects of neighborhoods.	Logistic regression models were benefited by including an ecological framework that contains neighborhood context in screening assessments.	Knowing the role of neighborhoods can lead to a more engagement of practitioners and encouragement of healthy lifestyle changes. More resources and investment in strategies to improve safety of the built environment are needed.
A model of environmental correlates of	Test a conceptual model of home and	Descriptive, cross-sectional study using 2007 National Survey	Access to Physical Activity, Social Capital, Home Sedentary Behavior,	Neighborhood Condition had indirect effects on obesity	This study provides a basis for identifying adolescents at risk	Interventions should target not only sedentary behavior and physical activity but also parent

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
adolescent obesity in the United States. Nesbit, K. C., Kolobe, T. H., Sisson, S. B., & Ghement, I. R. (2014).	neighborhood environmental correlates of adolescent obesity	of Children's Health. The sample consists of 39,542 children aged 11–17 years. Structural equation modeling was used to identify direct and indirect effects of Access to Physical Activity, Neighborhood Conditions, Social Capital Home Sedentary Behavior, and Physical Activity.	and Physical Activity had direct effects on obesity. Access to Physical Activity had indirect effects on obesity through Physical Activity, Social Capital, and Home Sedentary Behavior	through Access to Physical Activity, Social Capital, and Home Sedentary Behavior.	for obesity and a guide for assessing their environmental risk factors. There is a need for tested models to inform theory for program evaluation and intervention planning.	perceptions of safety, access to physical activity, and the condition of the neighborhood
Correlates of Overweight and Obesity Among American Indian/Alaska Native and Non-Hispanic White Children and	Increase the understanding of risk factors for childhood overweight and obesity among	2007 National Survey of Children's Health data was used for this population-based, cross-	Prevalence of overweight/obesity was 29% among NHW children and 48.3 % among	Factors associated with overweight/obesity did not differ between NHW and AI/AN children, with the	Longitudinal studies are needed to confirm findings. High levels of social capital within communities can	Culturally sensitive interventions targeting individual predictors, such as sports team participation and television viewing, in conjunction with

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
Adolescents: National Survey of Children's Health, 2007 Ness M, Barradas DT, Irving J, Manning SE./2012	AI/AN communities	sectional survey. 91,642 surveys were completed nationally. Data was limited to non-Hispanic (NH) white and AI/AN children residing in Alaska, Arizona, Montana, New Mexico, North Dakota, Oklahoma, and South Dakota. The neighborhood environment included social and physical environments, which were assessed by parent's report of perceived neighborhood support, perceived community and	AI/AN children in this sample. Perceived lack of neighborhood support was significantly associated with higher odds of overweight/obesity among NHW children. Younger age, male sex, household income less than 400 % of the FPL were significantly associated with higher odds of overweight/obesity among NHW children. Similar associations were observed among AI/AN children.	exception of sports team participation.	influence the spread of healthy norms. There are gaps in the literature describing interventions designed to improve social capital within communities.	neighborhood-level factors, may be effective in addressing childhood overweight/obesity among AI/AN children.

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
		school safety, and the presence of parks, sidewalks, and recreation centers. Chi-square statistics and pooled and race-stratified logistic regression were performed.				
Neighborhoods, Schools and Obesity: The Potential for Place-Based Approaches to Reduce Childhood Obesity Elbel B, Corcoran SP, Schwartz AE /2016	To determine the possibility of place-based methods to decrease childhood obesity	NYCDOE provided data on 584,000 student records of children K-8th grade in NYC public schools during the 2009–2010 school year. BMI and obesity measures were linked to student demographics, included school	For each neighborhood and school, raw, unadjusted mean obesity rate was calculated. Multilinear regression models were used to adjust for differences in students across neighborhoods and schools. Childhood obesity and overweight in	Reducing the place-based effect of obesity of students in high obesity neighborhoods and schools to that of similar students in lower obesity neighborhoods would affect the overall rate of obesity. If policies were able to reduce	There is a need for targeted, interventions, since changing a high obesity neighborhood affects a greater number of students than a lower one.	Differences in the built environment and school could have meaningful effects. Other approaches need to be considered along with neighborhood and school-level interventions.

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
		and home address.	NYC public schools varies among sociodemographic characteristics. In NYC, male, low-income, black, and Hispanic, children are more likely to be obese than female, white, Asian, and foreign-born children.	neighborhood & school effects, the obesity rate could be decreased about 8-12%.		
School-Based Obesity Policy, Social Capital, and Gender Differences in Weight Control Behaviors Zhu, L. and Thomas, B./2013	To conduct a state-level comparison, of how school-based obesity policies and social capital influence weight control behaviors by gender	Estimated state-level ecologic models using 1-way random effects from panel data for 43 states. Data was obtained from the 1991-2009 CDC Youth Risk Behavior Surveillance System.	School-based obesity policies in active communities had varied results in improving weight control behaviors. Healthy and unhealthy weight control behaviors increased among boys but not girls.	Social capital conditions policy effectiveness in large contexts. Heterogeneous behavioral responses are related to both school-based obesity policies and social capital. May produce findings on how social capital conditions the effect of obesity policies.	Studies are needed that use group-specific measures (e.g., comparing rural and urban populations or controlling for other socioeconomic factors) for social capital	Policies that do not differentiate between gender risk perceptions and behavioral patterns may produce mixed results and include inaccurate intervention goals. Both adopted policies and social capital may be a source of, rather than a cure for, unhealthy weight control behavior.

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
		Multiple interaction terms were used to assess how social capital moderates the effects of school-based obesity policies.				The mixed policy outcomes suggest that the lack of social capital that supports school-based policies may hinder effective policy interventions, showing how important the built environment's compatibility with specific school-based policies is. Effective policymaking that promotes healthy diet and physical activity should balance the design of policy interventions and community conditions where the policies are implemented.
The associations of perceived neighborhood disorder and physical activity with obesity	Perceived neighborhood disorder conceptual framework was used to determine if	Cross-sectional study with a sample of 101 African American adolescents age 12 to 16 years	Perceived neighborhood disorder as significantly and positively associated with obesity status.	Adolescents are more obese living in disordered neighborhoods.	Longitudinal studies needed to assess perceived neighborhood disorder	Need to separate features of neighborhood disorder to investigate the extent neighborhood characteristics may

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
among African American adolescents Dulin-Keita, A. Thind, AK, Affuso, O. and Baskin, M., 2013	among African American adolescents, physical activity mediates the relationship between perceived neighborhood disorder and obesity.	and their parents from the Birmingham, Alabama metropolitan area. The primary outcome measure was obesity using the International Obesity Task Force cut off points. Physical activity was measured using accelerometry. Perceived Neighborhood Disorder Scale measured perceived neighborhood disorder. Mediation models were	Moderate-to-vigorous physical activity and obesity were inversely-related. No evidence to support a significant mediating effect of moderate-to-vigorous physical activity on the relationship between neighborhood disorder and obesity status.	Since obesity can continue into adulthood, these youth may have increased risks for adverse health outcomes later in life.	characteristics and childhood adiposity.	affect children's physical activity.

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
		used to evaluate if physical activity mediates the relationship between neighborhood disorder and obesity status.				
Influences of socioeconomic factors on childhood and adolescent overweight by gender in Korea: cross-sectional analysis of nationally representative sample Noh, J., Kim, Y., Oh, I. and Kwon, Y./2014	Among Korean children and adolescents, investigate the association between socioeconomic status and overweight status by gender.	2009 Korean Survey on the Obesity of Youth and Children containing 8,555 subjects. Subjective SES, parent education, parental occupation, and family structure were used to measure parental SES. Chi-squared tests and multiple logistic regression analysis	After adjusting for demographic variables such as gender and age, parental interest in weight management of children, and parental body shape, low economic status increased the probability of childhood overweight.	Inverse relationship between parental SES variables and the children and adolescent overweight status. Less parental interest is related to high risk of overweight.	Interventions determining the inheritance of overweight are needed.	Because lifestyle may also be affected by SES, a targeted intervention for families with lower SES could be beneficial.

Author/Date	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future Research	Implications for Practice
The neighborhood social environment and body mass index among youth: a mediation analysis Veitch, J., Van Stralen, M., Chinapaw, M. et al./2012	Examine associations between neighborhood social environment and body mass index in youth.	Data were collected in high and low socio-economic areas of Melbourne, Australia in 2004 and 2006. Children Living in Active Neighborhood (CLAN) study Multilevel linear regression analyses and Mediation analyses conducted	Positive social network and greater social trust/cohesion was related to decreased BMI among children. No findings that sedentary behaviors or physical activity mediated this relationship.	Neighborhood social environment may play a role in preventing childhood overweight and obesity.	Research investigating the mechanisms through which the neighborhood social environment impacts BMI is needed. Studies should include measures of dietary intake and precise measures of physical activity and sedentary behavior.	

Methodology Critique

Duke and Browosky (2012) investigated parent perceptions of neighborhood and its association with youth aerobic physical activity and weight. Using secondary data from the 2007 National Survey of Children's Health (NSCH) data, the sample size included 64,076 participants. Logistic regression models were used which were appropriate for the measures evaluated. While the sample size was large, the NSCH does not sample for representativeness of all neighborhoods or types of neighborhoods. Additionally, the neighborhood measures used in the study were not objective, so an ecological analysis was not able to be performed. Despite these weaknesses, this study does add to the literature showing that neighborhood characteristics are associated with youth weight and physical activity.

Nesbit et al. (2014) also conducted a cross-sectional analysis using 2007 NSCH data. Structural equation modeling was used to test the model fit of home and neighborhood correlates and determine the direct and indirect effects. Strengths of the study are the large sample size of 39,542 adolescents and the theoretical foundation of the social-ecological framework. However, this study has similar weaknesses as the Duke and Borowsky (2012) study due to the same data set being used.

Ness et al. (2012) conducted a cross-sectional analysis using 2007 NSCH data to determine risk factors for childhood overweight and obesity among American Indian and Alaskan Native communities. A sample size of 91,642 surveys were completed and the analysis included Non-Hispanic White and AI/AN children residing in Alaska, Arizona, Montana, New Mexico, North Dakota, Oklahoma, and South Dakota. Chi-square tests and logistic regression were used, and the results did not find significantly different

factors associated with overweight and obesity between Non-Hispanic White and AI/AN children. As previously stated, limitations of this data set include the cross-sectional nature of the data and the non-objective nature of the study. Additionally, due to small sample size, overweight and obesity were not able to be analyzed separately. Also, the public use 2007 data set did not allow for rural versus urban neighborhood comparisons.

Elbel et al. (2016) utilized 584,000 individual student records from administrative data provided by the New York City Department of Education on students in kindergarten through eighth grade in New York City public schools during the 2009–2010 school year. Multilevel linear regression was used to determine differences in the prevalence of obesity based on neighborhood and school location. A weakness of this study was that neighborhood predictors and factors were not taken into account in the analysis. Evaluating what factors within the neighborhood, such as social capital, can help parcel out what direct and indirect effects they have on obesity and overweight.

Zhu and Thomas (2013) investigated relations between school-based obesity policies, social capital, and adolescents' self-reported weight control behaviors using 1991-2009 CDC Youth Risk Behavior Surveillance System (YRBSS) data. State level data was pooled for 43 states with the exclusion criteria being no adolescent weight measures or social capital measures available. Low state participation in the YRBSS in 1991, 1993, and 1995 affected the sample mean which weakens the analysis. Social Capital was measured using Robert Putnam's concept of social capital as 5 components: participation in public activities, participation in community organizations, community volunteerism, informal sociability, and social trust (Zhu & Thomas, 2013). However, this

aggregated social capital index may limit the ability to parcel out different groups' access to social capital.

Dulin-Keita, et al. (2013) conducted a cross-sectional study of 101 African-American adolescents and their parents in Birmingham, Alabama to determine if the association between perceived neighborhood disorder and obesity was mediated by physical activity. Perceived neighborhood disorder was measured using the 15-item Ross and Mirowsky Neighborhood Disorder Scale and includes measures of social capital. One-way ANOVA, Kruskal-Wallis tests or Chi-square were performed to evaluate significant differences for the dependent and independent variables and a single meditation analysis was performed to determine if physical activity was a mediating factor. Weaknesses of this study include the lack of generalizability due to the small sample size and limited geographic region it was drawn from as well as the cross-sectional nature of the study.

Noh et al. (2014) examined the association between socioeconomic status (SES) and overweight status by gender among Korean children and adolescents. Data was analyzed from the 2009 Korean Survey on the Obesity of Youth and Children and included a sample size of 8,555 youth. Chi-squared tests and logistic regression were used for univariate and multivariate analyses, respectively. While the sample is nationally representative in Korea, there may be limited generalizability for youth from other countries.

In 2004 and 2006, Veitch et al. (2013) collected data in both high and low socio-economic areas of Melbourne, Australia to evaluate associations between neighborhood social environment and body mass index (BMI) in youth prospectively and cross-

sectionally. The sample consisted of 587 children in 2004 and 487 in 2006. A weakness of this study is that those included in the analysis had lower BMI than those who did not continue past baseline or with missing BMI data. Additionally, female caregivers had higher educational levels than those who did not continue past baseline. These differences may introduce selection bias into the sample. Multilevel linear regression analyses were performed to determine if there were relationships between the social environment and BMI. Mediation analyses were performed to evaluate whether associations between the social environment and BMI were mediated by physical activity. One weakness of this study was the measure of neighborhood social environment. The social environment only included social networks and social trust/cohesion and also was only the parent's perception and not the children. Also, the small sample size limited the ability to analyze by age and/or sex.

Assumptions and Limitations

The proposed study will utilize secondary survey data, which carries certain assumptions. First, there is the assumption that the survey respondents will be honest with their answers regarding their children. Despite the limitations that are associated with using data collected by another party, there is an assumption that due to the anonymous nature of the survey that data is valid and true.

Summary and Conclusion

While there has been a lot of research linking risk factors to obesity, the majority of the studies have targeted adults not youth. Furthermore, many of the past studies focused on the behaviors of individuals, and have not taken into account the neighborhood or built environmental factors that may play a role. Of those studies that do

take into account multiple levels of influence, limited studies utilize multilevel analysis methods to analyze the factors. Social capital research is growing particularly in relation to health status and well-being, but the main focus has been on adults. Childhood and adolescence in particular, are points in time when an individual interacts with social networks such as family, peers, and neighborhoods on a regular basis. Evidence on community social capital and child and adolescent health remains limited.

Section 2: Research Design and Data Collection

Introduction

As I noted in Section 1, the purpose of this study was to examine neighborhood social capital and how it relates to adolescent obesity. This section includes a discussion of the nature of the study, research design and rationale, methodology, threats to validity, and ethical considerations.

Research Design and Rationale

I used a cross-sectional research design for this study. This quantitative research approach was most appropriate for the research questions because I used secondary survey data and the purpose was to determine if there is a relationship between the independent and dependent variables (see Frankfort-Nachimas & Nachimas, 2008). Cross-sectional studies are less time-consuming and less expensive, which is important for researchers with limited resources. Other designs such as an experimental design would not have be appropriate because it would not be possible to replicate the study in real-life social situations (see Frankfort-Nachimas & Nachimas, 2008). It was necessary that I have a design as close to reality as possible, including a representative sample, since I sought to examine how neighborhood support interacts with adolescent weight. Although experimental designs allow for more control over external and internal variables, which can increase the ability to determine causality, for this specific topic it was not worth the loss of generalizability. Similarly, a quasi-experimental design would not have been appropriate. Although quasi-experimental designs are similar to cross-sectional studies, in this instance the use of multiple samples over an extended period of time would not have been feasible because of lack of resources.

In this research, I used secondary data because a large amount of data exists on the topic. Another advantage using secondary data is savings of time and cost (Soriano, 2013). I used the data set from the NSCH. It has been in use from 2003 to 2012 and contains questions pertaining to physical and mental health status, access to quality health care, and family, neighborhood, and social environment (Data Resource Center for Child Health, 2012). This is a telephone survey and the questions are focused on children ages 0-17 years old. This data was appropriate to use for answering the research questions because many of the survey questions target the research area. The main research variables were perceived neighborhood social capital and childhood obesity. I measured the independent variable, perceived neighborhood social capital, as a combination of the questions focused on neighborhood support and cohesion. The dependent variable, childhood obesity, was measured as body mass index. Additionally, covariates such as age, race, and gender are also included in the data set.

Methodology

In the following subsections, I describe how I performed the study. Specifically, I discuss the study population, sampling procedures, data management and analysis, threats to validity, and ethical consideration.

Target Population

The target population included non-institutionalized children under 18 years old residing in all 50 states and the District of Columbia (Child and Adolescent Health Measurement Initiative, 2012). Survey respondents were parents or guardians who were knowledgeable regarding the health and health care of the sampled child. In 2011-2012, 95,677 child-level interviews were completed nationally. This included approximately

1,850 interviews per state, which exceeded the goal of 1,800 surveys per state to achieve sufficient power of at least 80% (Centers for Disease Control and Prevention, 2013). This reduces the likelihood of a type 2 error occurring. To reduce type 1 errors, I used an alpha level of 0.05. In this study, I completed a power analysis to determine if sufficient cases were present at 80% power to analyze the independent variables of supportive neighborhoods and safer communities as they relate to adolescent obesity. For supportive neighborhoods, 800 cases were needed for 95% significance level. This was exceeded, with 13,136 cases of children in non-supportive neighborhoods and 80,333 cases of children in supportive neighborhoods. For safer communities, 902 cases were needed. This requirement was also exceeded with 8,867 cases of children in unsafe communities, and 85,034 cases in safer communities.

Sampling and Sampling Procedures

United States households with at least one 0- to 17-year-old child resident at the time of the interview were included in the cross-sectional telephone survey. The National Center for Health Statistics used an approach called the State and Local Area Integrated Telephone Survey (SLAITS) as a way to collect information on health topics at the local and state levels. Probability sampling was used, which ensures that the variable values in sample drawn from the population do not differ from the values of the population parameter more than a specific amount (Frankfort-Nachmias and Nachmias, 2008). The survey sample was obtained using a list-assisted random-digit-dial sample of landline telephone numbers and accompanied by an independent random-digit-dial sample of cell phone numbers. The survey design was complex and included stratification by state and phone type. The sampling frame was the identical to the Centers for Disease Control and

Prevention's National Immunization Survey and in selected households, followed right after the NIS interview for cost-saving and efficiency. Data was collected from February 28, 2011 through June 25, 2012 (Centers for Disease Control and Prevention, 2013).

Telephone numbers were called, and eligibility was determined by screening for residential status and the presence of children 0 to 17 years old at the time of the call. Additionally, for the cellphone sample, several telephone status questions were asked. For the first quarter of 2011, households contacted by cellphone were eligible only if there was no landline telephone or if the respondent indicated that they were unlikely to be reached through the landline if they had one. After April 2011, respondents were not screened for cellphone status and were included in the interview if there was an eligible child in the household.

Incentives were provided to increase the likelihood that eligible households would participate. Eligible households that were known to have not completed the interview were eligible for an incentive. The incentive was a prepaid incentive of $1 with a promised incentive of an additional $10 upon completion of the interview for landline cases with an address match, or a promised incentive of $11 for landline cases without an address match. Cell sample cases were promised up to $15 upon completion of the interview. Fifteen dollars was the maximum total value offered to any household.

Data Management

I obtained the NSCH from 2011-2012 by written request from the National Center for Health Statistics (NCHS). The data set includes all records and variables from the NCHS public use data files for the surveys.

Instrumentation and Operationalization of Constructs

The survey instrument was designed and sponsored by the Maternal and Child Health Bureau at the Health Resources and Services Administration in partnership with National Center for Health Statistics at the Centers for Disease Control and Prevention, Child and Adolescent Health Measurement Initiative, and a National Technical Expert Panel. In Table 2, I list the variables investigated in this study.

I operationalized *supportive neighborhoods* using four items from the survey instrument: (a) people in my neighborhood help each other out, (b) we watch out for each other's children in this neighborhood, (c) there are people I can count on in this neighborhood; and (d) if my child were outside playing and got hurt or scared, there are adults nearby who I trust to help my child. Respondents were asked whether they strongly agree, agree, somewhat disagree, or strongly disagree with each statement. I operationalized *safer communities* using the survey statement Children whose parents report their neighborhood or community is never safe for children; sometimes safe for children; or usually/always safe for children. Overweight and obesity is measured using BMI. I operationalized these using parental reports of their child's height and weight measurements.

Nominal measures, defined as numbers or symbols used to classify objects into categories, were vital to this study (see Frankfort-Nachmias and Nachmias, 2008). The independent variables of *supportive neighborhoods* and *safe communities* were nominal, as were the control variables *gender* and *race*. I also used ratio measures in this study to measure the dependent variable *BMI* and the control variable *age*. Ratio measures are

when variables have absolute and fixed natural zero points (Frankfort-Nachmias and Nachmias, 2008).

Table 2

Operationalization and Definition of Variables and Response Categories

Construct	Operational Definition	Scale
Children's Overall Health Status	Children's current overall health status	Excellent or very good; good; fair or poor
Overweight/Obese	Body mass index 85th percentile or greater	Yes or No
Age	Age in years of the child	Age 0-3 years; Age 4-7 years; Age 8-11 years; Age 12-14 years; Age 15-17 years
Race	Race and ethnicity of the child	Hispanic; White, non-Hispanic; Black, non-Hispanic; Other, non-Hispanic
Gender	Gender of child	Male or Female
Safer Communities	Children whose parents report their neighborhood or community is never safe for children; sometimes safe for children; or usually/always safe for children	1 "Never/Sometimes safe"; 2 "Usually/always safe"
Supportive Neighborhood	Children who are living in supportive neighborhoods; children living in neighborhoods that are not supportive in two or more ways	1"Definitely agree"; 2 "Somewhat agree"; 3 "Somewhat disagree"; 4 "Definitely disagree

Validity

Creswell (2009) has defined validity as the situation in which meaningful conclusions "can be drawn from scores on specific instruments" (p. 149). Several types of validity were pertinent to this study, including content, predictive, and construct validity. When checking for content validity, researchers check to see if items actually measure the concepts that they are trying to measure. When checking predictive validity, researchers check to see if results correlate with other results. Finally, when reviewing construct validity, researchers check to see if items measure hypothetical constructs (Creswell, 2009). When looking at the selected variables, I determine that they had face validity, in that they seemed appropriate for measuring the concepts of supportive neighborhoods and safe communities. Past researchers have documented the validity of the instrument used in the NSCH (NSCH; Moore et al., 2012).

Reliability

Reliability is related to whether items on a survey are internally consistent. Quantitative reliability determines if a research approach is consistent across different research projects and in testing or scoring (Creswell, 2009). The test-retest method, split-half method, and parallel forms technique are all methods of measuring reliability (Frankfort-Nachmias & Nachmias, 2008). Reliability and validity are equally important in research because they help researchers determine if an instrument is useful in survey research. Many researchers have used data from the NSCH, and have found that the instrument is reliable (Moore et al., 2012; Blumberg et al., 2012; Davidson et al., 2012; Akin-Olugbemi, 2011). The NSCH is also reliable because of its inclusion of a nationally

representative sample, which increases generalizability (Centers for Disease Control and Prevention, 2013).

A documented limitation of the NSCH is the nonresponse rate, which can affect validity. There was a national response rate of 38.2% for the landline sample, 15.5% for the cell phone sample, and 23.0% for the combined dual-frame sample (Centers for Disease Control and Prevention, 2013). To reduce nonresponse bias, sampling weights were used and a nonresponse bias analysis was conducted. Results showed that the population interviewed was more likely to live in rural areas, have higher levels of home ownership, have lower home values, and identify as non-Hispanic white people.

Research Questions

Research Question 1: Are adolescents in supportive neighborhood less likely to be overweight or obese?

$H_0$1: There is no statistically significant association between adolescents living in a supportive neighborhood and being overweight or obese.

H_A1: There is a statistically significant association between adolescents living in a supportive neighborhood and being overweight or obese.

This hypothesis will be tested with multiple logistic regression analysis to control for the following covariates: race, age, and gender.

Research Question 2: Are adolescents in safer communities less likely to be overweight or obese?

$H_0$2: There is no statistically significant association between adolescents living in safer communities and being overweight or obese.

H_A2: There is a statistically significant association between adolescents living in safer communities and being overweight or obese.

I tested these hypotheses using multiple logistic regression analysis to control for the following covariates: race, age, and gender.

Data Analysis Plan

I performed data analyses using SPSS version 21. Specifically, I used SPSS to conduct descriptive, univariate, bivariate, and multivariate analyses. Descriptive analyses included cleaning and screening data where appropriate, including recoding and categorization. Univariate analysis consisted of frequency distributions. Bivariate analysis included correlations, cross tables, Chi-squares, and simple linear regression. I performed multiple logistic regression analyses to determine if associations existed and to measure significance levels between independent and dependent variables while controlling for covariates (see Green & Salkind, 2014).

Threats to Validity

Threats to internal validity must be considered in research such as this. To counteract these threats, participants can be randomly selected, or participants can be chosen who do not have extreme characteristics. The cross-sectional design minimizes other internal validity threats because issues such as history, maturation, and mortality are avoided since participants are surveyed one time. Threats to external validity that I evaluated were interactions of the survey with the selection setting and history of the participants. To reduce external validity threats, results can be compared with previous studies that have taken place or additional studies can be conducted to see if the results

can be duplicated. Also, generalizations must be limited to similar populations to the one used in the study, so I made effort to make sure the study population was representative.

Ethical Considerations

Ethical issues are of the utmost importance and must be considered in aspects of research, including the development of the research question, data collection, data analysis and interpretation, and writing and disseminating research (Creswell, 2009). One major issue is ensuring that the data collected remains confidential. Although the data used was secondary in nature, issues such as ensuring the data is held in a secure location and identifying and minimizing potential risks, were addressed before research began (Walden University Institutional Review Board for Ethics Standards in Research, n.d.). For the NSCH, the public use data are anonymous, and confidentiality was maintained by collapsing racial categories due to small numbers so that individual children could not be identified (Centers for Disease Control and Prevention, 2013).

A second ethical issue is making sure that the parent of the child obtained informed consent. Informed consent allows a research participant to be fully aware of the risks and benefits of participating in the research so that they can make an informed decision (Soriano, 2013). In the NSCH, informed consent was obtained before individuals were allowed to participate so that any ethical concerns could be addressed before the data collection process started.

Researchers must also take participants' literacy into consideration. Surveys should be culturally competent and not exhibit any form of bias (Levy Paluck & Green, 2009). Researchers should develop survey questions using plain language so that they are

easily understood by participants (Plain Language Action and Information Network, n.d.). Additionally, researchers should use participants' preferred language. In the NSCH, the survey items were transferred into multiple languages including Spanish, Korean, Vietnamese, Mandarin, and Cantonese (Centers for Disease Control and Prevention, 2013). The sample used for this survey was nationally representative, and questions regarding age, gender, race/ethnicity, and household size were all taken into account.

Section 3: Presentation of Results and Findings

Introduction

The purpose of this study was to determine if adolescent obesity is associated with supportive neighborhoods and safer communities. Utilizing multiple logistic regression analysis, I determined odds ratios for adolescents who are overweight or obese and compared them to adolescents who were not. I controlled for covariates that were suspected or known to be associated with adolescent obesity. In this chapter, I describe the collected data, descriptive and demographic characteristics of the sample, data analysis procedures, and results.

The following research questions and hypotheses were proposed:

Research Question 1: Are adolescents in supportive neighborhood less likely to be overweight or obese?

$H_0$1: There is no statistically significant association between adolescents living in a supportive neighborhood and being overweight or obese.

H_A1: There is a statistically significant association between adolescents living in a supportive neighborhood and being overweight or obese.

This hypothesis will be tested with multiple logistic regression analysis to control for the following covariates: race, age, and gender.

Research Question 2: Are adolescents in safer communities less likely to be overweight or obese?

$H_0$2: There is no statistically significant association between adolescents living in safer communities and being overweight or obese.

H_A2: There is a statistically significant association between adolescents living in safer communities and being overweight or obese.

Data Collection and Cleaning

Data from the 2011/2012 NSCH were provided by Data Resource Center for Child and Adolescent Health. Survey data was originally collected from February 28, 2011 through June 25, 2012 (Centers for Disease Control and Prevention, 2013). A total of 95,677 child-level interviews were completed nationally, with 1,811 to 2,200 interviews collected per state. The results of the NSCH are weighted to represent the population of non-institutionalized children ages 0-17 nationally, and in each state (Data Resource Center for Child Health, 2012).

I selected overweight and obese cases using BMI as an indicator. For children, body fat composition changes as they grow and can differ by gender, so they are measure differently than adults. Underweight is less than the 5th percentile, healthy weight is the 5th percentile to less than the 85th percentile, overweight is the 85th to less than the 95th percentile, and obese is the 95th percentile or greater. In this study, I categorized individuals with a BMI over the 85th percentile as overweight or obese for the purposes of analysis. Additionally, only children ages 10 years and older were included in the variable for adolescent obesity.

Responses of "don't know" or "refused" and system missing data were not included in the analysis. The unknown values were less than 1% of the responses to any of the questions, with the exception of BMI (4.8% of children age 10-17 nationwide) and race/ethnicity (2.7% nationwide; CDC, 2013).

Descriptive and Inferential Statistical Results

Descriptive Statistics

Demographic characteristics. Descriptive analysis is presented in Table 3. Age ranged from 10 to 17 years old, with 47% (*n* = 20, 616) children aged 10-13 years old and 53% (*n* = 23,248) children aged 14-17 years old. Of 43,864 participants, 52.2% were male and 47.8% were female. White, non-Hispanics accounted for 69.6% (*n* = 29,892) of the participants, and 10.9% (*n* = 4,677) were Hispanic. Black, non-Hispanics made up 9.6% (*n* = 4,129) of the participants and the remaining 9.9% (*n* = 4,253) include multi-racial individuals, as well as other non-Hispanic groups including Asian, Native American, and those of Alaskan Eskimo origins.

Overall health and weight status. Sixty-two percent of adolescents were rated by their parents as having excellent overall health. Comparatively, there were significantly fewer study participants with fair and poor rated health, at 2.3% and 0.4% cases, respectively. Overweight and obese adolescents who were rated as having a BMI of 85% or greater accounted for 29.2% (*n* = 12,788) of the participants. There were 70.8% (*n*=31,076) adolescents having a body mass index less than 85%.

Neighborhood social capital. Of the study participants, 59.3% stated that they lived in communities that were always safe. Adolescents living in usually safe communities accounted for 32.5% participants. The number of adolescents living in sometimes safe or never safe communities was 6.9% and 1.2% participants, respectively. Eighty-eight percent of adolescents lived in supportive neighborhoods as compared to 12% in non-supportive neighborhoods.

Table 3

Descriptive Characteristics of Adolescents 10-17 Years Old, National Survey of Children's Health, 2011-2012

Variable	Frequency	Percentages
Gender (*n* = 43,864)		
Male	22916	52.2%
Female	20948	47.8%
Race (*n* = 42,951)		
White, non-Hispanic	29892	69.6%
Hispanic	4677	10.9%
Black, non-Hispanic	4129	9.6%
Multi-racial/Other, non-Hispanic**	4253	9.9%
Age group (years) (*n* = 43,864)		
10-13 years	20616	47.0%
14-17 years	23248	53.0%
Overall Health Status (*n* = 43,862)		
Excellent	27032	61.6%
Very Good	11181	25.5%
Good	4446	10.1%
Fair	1017	2.3%
Poor	179	0.4%
Overweight/Obese (*n* = 43,864)		
Yes	12788	29.2%
No	31076	70.8%
Safer Communities (*n* = 43,230)		
Never Safe	508	1.2%
Sometimes Safe	2987	6.9%
Usually Safe	14034	32.5%
Always Safe	25644	59.3%
Supportive Neighborhood (*n* = 43,005)		
Do Not Live in Supportive Neighborhoods	5152	12.0%
Live in Supportive Neighborhoods	37853	88.0%

*Total may not sum to 100% due to missing values.

**Other Race/Ethnicity includes Asian, Native American, and Alaskan Eskimo Origins.

Additionally, I performed bivariate analysis to test the association between the dependent variable *adolescent obesity* and the independent variables. Data was analyzed using cross-tabulation to determine which variables were appropriate to use in the multiple logistic regression model. Results of the analysis are shown in Table 4. Responses of Don't Know and Refused for the variables overall general health status and safer communities were omitted from the table as they only accounted for 0.2% and <0.0% of answers, respectively. Overall general health status, age group, race/ethnicity, gender, safer communities, and supportive neighborhoods were all found to be significantly associated with adolescent overweight/obesity.

Table 4

Frequencies and Bivariate Analysis of Covariates by Overweight/Obesity

Variable	**Overweight/Obese**				
	% No	% Yes	Total	X^2 (df)	Significance (p)
Overall General Health Status				1504.63 (6)	0.000
Excellent	77.1	22.9	27032		
Very Good	63.7	36.3	11181		
Good	56.3	43.7	4446		
Fair	48.6	51.4	1017		
Poor	59.0	41.0	178		
Age Group (years)				629.24 (1)	0.000
10-13 years	65.1	34.9	20616		
14-17 years	76.0	24.0	23248		
Race/Ethnicity				701.01 (3)	0.000
White, non-Hispanic					
Hispanic	74.3	25.7	29892		
Black, non-Hispanic	62.5	37.5	4677		
Multi-racial/Other, non-Hispanic	57.4	42.6	4129		
	69.5	30.5	4253		
Gender				351.31 (1)	0.000
Male					
Female	67.0	33.0	22916		
Safer Communities	75.1	24.9	20948	185.18 (5)	0.000
Never Safe					
Sometimes Safe	61.4	38.6	508		
Usually Safe	61.2	38.8	2987		
Always Safe	72.5	27.5	14034		
Supportive Neighborhoods	71.4	28.6	25644	202.08	0.000
Do Not Live in Supportive Neighborhoods	62.5	37.5	5152		
Live in Supportive Neighborhoods	72.1	27.9	37853		

Logistic Regression

In the bivariate analysis, adolescent obesity was correlated with overall general health status, age, race/ethnicity, gender, safer communities, and supportive neighborhoods ($p < 0.05$). I performed both univariate and multivariate logistic regression to ascertain the effects of race, age, gender, safer communities, and supportive neighborhoods on the likelihood that an adolescent is overweight or obese. The logistic regression model was statistically significant $X^2(8) = 78.715$, $p < 0.005$. The model explained 9.5% (Nagelkerke R^2) of the variance in adolescent overweight and obesity and correctly classified 71.4% of cases. A 95% confidence interval was used which allows a 95% certainty that the odds ratio fall within the range of values. If the confidence interval includes 1.0, then the results are not statistically significant. P-values showing significance are also include in Table 5 as well.

Females were 0.654 times less likely to be overweight or obese than males (reference group). Adolescents ages 14 to 17 years old were 0.571 times less likely to be overweight or obese than younger adolescents 10 to 13 years old (reference group). Compared to Hispanic adolescents (reference group), White non-Hispanics were 0.709 times less likely to be overweight or obese. Black, non-Hispanic adolescents were 1.311 times more likely to be overweight or obese than Hispanic adolescents. Multi-racial adolescents, or those in other racial groups were 0.816 times less likely to be overweight or obese than Hispanic adolescents. Decreasing overall health status was associated with an increased likelihood of being overweight or obese.

Research Question 1: Are adolescents in supportive neighborhood less likely to be overweight or obese?

$H_0$1: There is no statistically significant association between adolescents living in a supportive neighborhood and being overweight or obese.

H_A1: There is a statistically significant association between adolescents living in a supportive neighborhood and being overweight or obese.

Controlling for age, gender, race, and overall health status, adolescents living in a supportive neighborhood were 0.797 times less likely to be overweight or obese. The null hypothesis was rejected.

Research Question 2: Are adolescents in safer communities less likely to be overweight or obese?

$H_0$2: There is no statistically significant association between adolescents living in safer communities and being overweight or obese.

H_A2: There is a statistically significant association between adolescents living in safer communities and being overweight or obese.

Controlling for age, gender, race, and overall health status, safer communities did not statistically significantly predict the odds of adolescent overweight or obesity. For example, compared to adolescents in communities that are never safe, adolescents in sometimes safe communities had slightly increased odds of 1.121. However, since the 95% confidence interval of 0.912 to 1.376 spans 1.0, the increased odds does not reach statistical significance. Thus, the null hypothesis was not rejected.

In comparing the results from the univariate and multivariate logistic regression, the odds of having increased overall general health were higher until the other variables were added into the model. Similar results were found for age and gender. Conversely, race/ethnicity, safer communities, and supportive neighborhoods all had increased odds of adolescent overweight or obesity once all variables were introduced to the model.

Table 5

Univariate and Multiple Logistic Regression Analysis for Overweight/Obesity (n=42,652)

Covariates	Univariate Odds Ratio (95% CI)	*p*-value	Multivariate Odds Ratio (95% CI)	*p*-value
Overall General Health Status				
Excellent	Reference		Reference	
Very Good	1.924 (1.834, 2.019)	0.000	1.906 (1.813, 2.004)	0.000
Good	2.612 (2.446, 2.790)	0.000	2.434 (2.270, 2.609)	0.000
Fair	3.569 (3.146, 4.049)	0.000	3.398 (2.976, 3.811)	0.000
Poor	2.344 (1.736, 3.164)	0.000	2.250 (1.645, 3.076)	0.000
Age group (years)				
10-13 years	Reference		Reference	
14-17 years	0.589 (0.565, 0.614)	0.000	0.571 (0.547, 0.597)	0.000
Race/Ethnicity	0.575 (0.539, 0.613)	0.000	0.709 (0.662, 0.759)	0.000
White, non-Hispanic	Reference		Reference	
Hispanic	1.235 (1.133, 1.345)	0.000	1.311 (1.198, 1.433)	0.000
Black, non-Hispanic	0.729 (0.668, 0.796)	0.000	0.816 (0.745, 0.895)	0.000
Multi-racial/Other, non- Hispanic				
Gender				
Male	Reference		Reference	
Female	0.672 (0.644, 0.700)	0.000	0.654 (0.626, 0.683)	0.000
Safer Communities				
Never Safe	Reference		Reference	
Sometimes Safe	1.008 (0.831, 1.223)	0.937	1.121 (0.912, 1.376)	0.278
Usually Safe	0.604 (0.509, 0.725)	0.000	0.936 (0.769, 1.140)	0.513
Always Safe	0.636 (0.531, 0.762)	0.000	1.057 (0.868, 1.286)	0.581
Supportive Neighborhoods				
Do Not Live in Supportive Neighborhoods	Reference		Reference	
Live in Supportive Neighborhoods	0.645 (0.607, 0.686)	0.000	0.797 (0.745, 0.852)	0.000

Summary of Findings

In conclusion, I performed an analysis to determine how neighborhoods affect adolescent obesity. The hypotheses were that the main factors, safeness of a community and the supportiveness of the neighborhood, were significantly associated with adolescent obesity. Other factors taken into account were the child's overall health status, age, gender, and race. This study's findings have shown that the safeness of a community is not significantly related to adolescent obesity after adjusting for the supportiveness of the neighborhood. The supportiveness of a neighborhood is associated with adolescent obesity, as is overall health status, age, race, and gender.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

To investigate whether an association was present between neighborhood social capital and adolescent obesity, this research study utilized data from the 2011-2012 NSCH. The social ecological model provided the theoretical framework. Section 4 includes the interpretation of findings, study limitations, recommendations, and implications for social change.

Interpretation of Findings

Study participants were more likely to be White, non-Hispanic, in excellent health, not overweight or obese, and living in safe communities and supportive neighborhoods. These descriptive characteristics are similar to the participants in the overall NSCH, 2011-2012. According to the results in Section 3, there were multiple significant associations between adolescent obesity and the study variables. As overall health status decreases, the likelihood of an adolescent being overweight or obese increases. Adolescents 14-17 years old were less likely to be overweight or obese than those who were 10-13 years old. Female adolescents were less likely to be overweight or obese than their male counterparts. White non-Hispanics adolescents were less likely to be overweight or obese than Hispanic adolescents. Likewise, multiracial, Asian, and Pacific Islander adolescents were less likely to be overweight or obese than Hispanic adolescents. Black non-Hispanic adolescents were the most likely to be overweight or obese of all the racial and ethnic groups studied.

In answer to the first research question of whether adolescents in supportive neighborhoods were less likely to be overweight or obese, the results showed the supportiveness of a neighborhood decreased the odds of obesity occurring. This means that there is some aspect of living in a supportive neighborhood that protects adolescents from being overweight or obese.

The second research question evaluated the question of whether adolescents in safer communities are less likely to be overweight or obese. The study findings showed that living in a safer community did not decrease the odds of obesity occurring in adolescents. Therefore, there are other factors at play when it comes to living in safer communities.

The findings that supportive neighborhoods were protective of obesity and decreased the odds by 0.797 were similar to those in a study conducted by Borrell et al. (2016) who found that children and adolescents living in non-supportive neighborhoods were 20% more likely to be obese after controlling for asthma, poverty, physical activity and sedentary activities, and other demographic variables. In contrast, Borrell et al. (2016) did find an association between unsafe neighborhoods and obesity, with differing probabilities by race and ethnicity. The researchers used log-binomial regression to determine the relative risk. Relative risk is comparable in magnitude with odds ratios when the outcome is rare, however, in the case of a more common outcome such as obesity, odds ratios may overestimate risk (Last, et al., 2004)

Social capital is associated with increased risk of obesity in other countries as well. Working with data from the Austrian Health Interview Study, Muckenhuber et al.

(2015) used an adjusted binary logistic regression model to analyze a subset of the sample. Women with lower levels of social capital were more likely to be obese than those with higher levels of social capital. These results remained even after adjusting for socioeconomic status and other lifestyle factors. These studies confirm the results found in the present study as we looked at sociodemographic, health status, and social capital factors.

Limitations of Study

One limitation of this study was my use of cross-sectional data. A causal relationship between variables cannot be determined because the NSCH was collected at only one point in time. A second limitation was that the data was self-reported. Self-report data may be susceptible to recall bias. A documented limitation of the NSCH is the nonresponse rate, which can affect validity. The national response rate was 38.2% for the landline sample, 15.5% for the cell phone sample, and 23.0% for the combined dual-frame sample (Centers for Disease Control and Prevention, 2013). To reduce nonresponse bias, sampling weights were used, and a nonresponse bias analysis was conducted (Centers for Disease Control and Prevention, 2013). The present study is limited in generalizability on a national level due to the sampling weights not being used in analysis. Although limitations exist, this study has broadened scholarly knowledge of the factors involved in adolescent obesity and provided a foundation for future studies.

Recommendations

The determination that supportive neighborhoods are associated with adolescent obesity leads to the need for further studies. Examination of what specific aspects of

neighborhood support that play a role need to be parceled out and investigated. Social support is just one component of social capital, and other aspects such as diversity of friendship networks or civic involvement may influence adolescent obesity outcomes as well. Furthermore, the finding that safer communities was not associated with adolescent obesity is not consistent with prior studies of related variables (Singh, 2010). Although safer communities were not found to decrease the odds of adolescent obesity in our multivariate logistic model, in the univariate analysis living in a usually or always safe community decreased the odds of adolescent obesity. Additional studies are needed to confirm or disregard these study results.

Implications for Positive Social Change

The implication for positive social change if focused on the significant relationship found between supportive neighborhoods and adolescent obesity. Although a neighborhood may have limited physical or financial resources, the social network between neighbors can play a role in influencing adolescent obesity outcomes. Public health practitioners may use these findings to better understand the factors that influence adolescent obesity in general, and the role of the social neighborhood environment in particular. In turn, public health workers can use this improved understanding to improve the quality of interventions, programs, and policies, resulting in positive social change among adolescents. Likewise, by taking into the impact that communities and institutions have on obesity, policy makers can make policies that can have a broader effect. Policy makers at the state and local level are particularly well-positioned to develop policies at that levels have been found to be most effective in combating adolescent obesity.

Successful examples of state and local obesity targeted policies include food regulations and soda tax policies (Gollust et al., 2013).

Conclusion

The main focus of this study was to determine if neighborhood social capital influenced adolescent obesity. The results of this study showed that there was a significant association between living in a supportive neighborhood and a decrease likelihood of an adolescent being overweight or obese. Associations were also found in demographic variables such as race, gender, and age. This study's findings help to improve understanding of factors that influence adolescent obesity in general, and the role of the social neighborhood environment in particular. Increased knowledge of these factors can improve the quality of interventions, programs, and policies, resulting in positive social change among adolescents. Research such as this is important to all individuals given that adolescent weight status can lead to more chronic diseases in adulthood, and the effect of the social environment encompasses whole communities.

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