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Association Between Childhood Obesity and Cerebral Palsy, Down Syndrome and Epilepsy or Seizure Disorder

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This is to certify that the doctoral study by

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Abstract

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by

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MA, Southern Illinois University Edwardsville, 2015

BS, Southern Illinois University Edwardsville, 2013

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

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Abstract

The purpose of this quantitative correlation study was to examine the association between childhood obesity (dependent variable) and cerebral palsy, Down Syndrome, and epilepsy and seizure disorders (independent variables), while controlling for the child's age, race, and sex among United States children ages 0-17, as well as the guardian's education and income levels. There are many studies related to childhood obesity; however, few focus on the independent variables in the current study in relation to overweight children. The Social Cognitive Theory (SCT) was used to understand and interpret the research findings. Secondary analysis of data was conducted using the National Survey of Children's Health (N = 59,963) survey data collected in 2018 and 2019. Logistic regression and both bivariate and multivariate analysis were conducted. Results indicated weak associations between childhood obesity and cerebral palsy (Chi-Square= 5.88, df= 1, p= 0.040); between a child who is overweight, has cerebral palsy, and is Hispanic (Chi-Square= 4.205, df= 1, p= 0.040); and between a child who is overweight, has epilepsy, and is Hispanic (Chi-Square= 5.24, df= 1, p= 0.022). Results further indicate there is a moderation effect of age with epilepsy or seizure disorder (Wald=2.050, p=0.033, OR=.488); sex with cerebral palsy (Wald=4.768, p=0.29, OR=.520); and sex with epilepsy or seizure disorder (Wald=832, p=0.191, OR=1.829). The potential positive social change implications of the study are to increase childhood obesity, socioeconomic factors, and disability association awareness and decrease associated morbidity and mortality.

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Dedication

This doctoral study is dedicated to my late mother, Sharron Marie Swanson. I could not have made it this far without my guardian angel. I love and miss you mom!

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Thank you to my chair, Dr. Richard Jiménez, for all of his support, guidance, and encouraging words. I could not have started or completed this process without your expeditious responses and vital knowledge about my subject and process. I would also like to thank my committee member, Dr. Sanggon Nam, for your assistance and support. Next, I would like to thank Dr. Chinaro Kennedy, my University Research Reviewer. Your knowledge and expertise regarding my study design and methodology were critical to my study, and for that, I say thank you. Lastly, thank you to my editor and statistician.

To my aunt, Dr. Stephanie Scurlark-Belt, thank you for pushing me, believing in me, and helping me start this program. To my sister and my backbone, Janae' Swanson, thank you for your kind words, love, encouragement, and tremendous support. To my close friends, thank you. This degree was tough but so worth it! Last but surely not least, I would like to thank God. It is because of His grace and mercy that I got through the toughest degree I have ever pursued. It has been a long 6 1/2 years, and I could not have done this without any of you!

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Section 1: Foundation of the Study and Literature Review

Introduction

Obesity has been identified as a nutrition-related chronic disease (NRCD) that has increased over the decades and can lead to several other health issues such as diabetes and coronary heart disease (Sahoo et al., 2015). According to the Centers for Disease Control and Prevention (CDC, 2021), for children to maintain a healthy body weight, they must consume nutritional foods and engage in physical activity. Lack of physical activity, diet, and genetics may cause childhood obesity (Sahoo et al., 2015). Although there is a plethora of research studies on childhood obesity and its relationship to physical activity and nutrition, there is a lack of information on the relationship between childhood obesity and some physical (PD) and intellectual disabilities (ID).

According to Segal et al. (2015), children with disabilities have a 13.4% higher obesity prevalence rate than children without a disability. Furthermore, Segal et al. (2015) suggested more research be conducted on childhood obesity and disabilities. This study will utilize data focusing on childhood obesity archived from the National Survey of Children's Health (NSCH) to examine the association between childhood obesity and the following intellectual and physical disabilities: cerebral palsy (CP), Down Syndrome (DS), and epilepsy or seizure disorders.

CP is one of the most common childhood disabilities that affects an individual's ability to move around, interact, and maintain balance (CDC, 2022). According to Barja et al. (2020), obesity is an emerging prognostic factor among individuals with CP. Over the years, the number of overweight children diagnosed with cerebral palsy has increased

(Meyns et al., 2016). Moreover, overweight children diagnosed with CP have trouble walking (Mudge et al., 2021), which is connected to a lack of physical activity (Mudge et al., 2021).

Down Syndrome is defined as "a genetic disorder caused when abnormal cell division results in an extra full or partial copy of chromosome 21" (Mayo Clinic, n.d.). Children and adolescents diagnosed with Down Syndrome or trisomy 21 are at a higher risk of being diagnosed as overweight or obese (Foerste et al., 2016). Considering the BMI and shorter stature of a child with Down Syndrome, they are more likely to be heavier than a child without Down Syndrome (Basil et al., 2016).

Epilepsy or seizure disorder is "any of various disorders marked by abnormal electrical discharges in the brain and typically manifested by sudden, brief episodes of altered or diminished consciousness, involuntary movements, or convulsions" (Merriam-Webster, n.d.). Researchers suggest that there be research conducted for improved methods to identify the relationship between seizure severity and obesity (Ng & Hodges, 2020). This study helps to close the gap on childhood obesity and its association to intellectual and physical disabilities.

This research study aids in preventing childhood obesity among disabled children whose parents are unaware of the relationship between this health issue and physical and intellectual disabilities. This study gives health practitioners important information about healthcare risk factors, disease trends, and functional abilities and disabilities in children. Moreover, this study focused on disabilities that are associated with obesity that have not yet been thoroughly studied. Lastly, this study's potential social change impact is to decrease morbidity and mortality associated with obesity among youth and children. To begin this study, Section 1 includes a discussion of the problem of the study, the purpose of the study, research questions and hypotheses, theoretical framework, nature of the study, literature review related to key variables, definitions, limitations, the significance of the research, and the summary and conclusion.

Problem Statement

According to the CDC, childhood obesity is an ongoing public health issue causing poor health among children and adolescents (CDC, 2021). The prevalence rate of childhood obesity in the U. S. was 49.7% amongst children ages 2-19 between 2011-2014 (CDC, 2021). Over 13.5 million children in the United States live with a determining diagnosis of obesity or being overweight (Imoisili et al., 2019).

Based on the literature review and previous research, there is a relationship between an overweight child and a physical or intellectual disability, specifically cerebral palsy, Down Syndrome and epilepsy or seizure disorder. Socioeconomic factors, lack of physical activity, environmental factors, and psychological factors are also associated with childhood obesity. The many concerns for overweight children with a disability include the inability to walk and or do things independently, increased risk of sleep disturbances such as obstructive sleep apnea, heart conditions, and complications from the medicine consumed for their disability. Other concerns are serious health issues that could lead to death in overweight children with an ID or PD. Lastly, the problem is that there are 49.7% of overweight children at risk for health conditions leading to mortality (CDC, 2021).

Socioeconomic factors such as the parents' income and education levels, and the child's age, sex, and race may influence a child's weight status. According to researchers Jin & Jones-Smith (2015), of the participants in their study, children living in a household with lower income were at a higher rate of obesity than children living in a household with higher income. Another researcher indicated that childhood obesity is complex and may vary over time according to the child's race, sex, and Hispanic origin (Ogden, 2018). Ogden also stated that the head of household's income and education level had some effect on the child's obesity status (2018). The lower the education and income level, the higher the childhood obesity prevalence rate (Ogden, 2018). More research should be conducted on the parents' education level, and the race and age of the child.

There is a lack of research on lifestyle factors and their relationship with childhood obesity (O'Shea et al., 2018). Children with these disabilities could experience a lack of social participation that affects their weight levels, as a lack of desire or incapability to interact socially could be detrimental to a child's weight. According to McPherson et al. (2016), further research is needed to address the understanding of childhood obesity findings and apply the findings to children who have physical disabilities. Bertapelli et al. (2016) suggested that further research is needed to address population-based research regarding the weight and BMI status of a child or youth with Down Syndrome. Based on the literature, more research should be conducted on intellectual and physical disabilities and their association with childhood obesity, race and age of child, and the socioeconomic factors of the parents, such as income and education level.

Purpose of Study

The purpose of this study is to generate knowledge of childhood obesity and its relationship to cerebral palsy, Down Syndrome, and epilepsy or seizure disorders, based on data from the National Survey of Children's Health collected in 2018-2019. This study also addressed the number of overweight, intellectually, and physically disabled children at risk for developing other serious health issues and factors mentioned above. This cross-sectional study examined the association between overweight children ages 0-17 and their diagnosis of the following physical and intellectual disabilities: cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. The confounding variables explored were the education level and household income of the parents and the age, race, and sex of the child.

The study provides insight on whether the physical and intellectual disabilities and the parent's socioeconomic status affect a child's weight status. This study also provides insight to other researchers and healthcare providers regarding if the age or race of the disabled child affects the child's weight status. Lastly, this study promotes childhood obesity prevention in children with physical and intellectual disabilities.

Research Variables and Study Population

The research variables and study population for this cross-sectional research study are as follows:

Dependent Variable (DV): Childhood Obesity as indicated by a doctor or other healthcare provider.

Independent Variables (IV): cerebral palsy, Down Syndrome, and epilepsy or seizure disorder

Confounding Variables (CV): socioeconomic status (SES) of the parent or guardian, education level of the parent or guardian, income level of the parent or guardian, as well as the age, race, and sex of the child.

Study Population: Children and adolescents up to age 17, nationwide, African American, White, Hispanic, and Non-Hispanic children.

Research Questions and Hypotheses

RQ1: Is there an association between childhood obesity and cerebral palsy?

$H_0$1: There is no association between childhood obesity and cerebral palsy.

$H_1$1: There is an association between childhood obesity and cerebral palsy.

RQ2: Is there an association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0$2: There is no association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

$H_1$2: There is an association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ3: Is there an association between childhood obesity and Down Syndrome?

$H_0$3: There is no association between childhood obesity and Down Syndrome.

$H_1 3$: There is an association between childhood obesity and Down Syndrome.

RQ4: Is there an association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0 4$: There is no association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

$H_1 4$: There is an association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ5: Is there an association between childhood obesity and epilepsy or seizure disorder?

$H_0 5$: There is no association between childhood obesity and epilepsy or seizure disorder.

$H_1 5$: There is an association between childhood obesity and epilepsy or seizure disorder.

RQ6: Is there an association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0 6$: There is no association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

$H_1$6: There is an association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ7: Does the education level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$7: The education level of the parent or guardian does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$7: The education level of the parent or guardian does have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ8: Does the income level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$8: The income level of the parent or guardian does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$8: The income level of the parent or guardian does have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ9: Does the age of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$9: The age of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$9: The age of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ10: Does the race of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$10: The race of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$10: The race of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ11: Does the sex of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$11: The sex of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$11: The sex of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

Theoretical Framework

The theoretical framework used for this study was the Social Cognitive Theory (SCT), formerly known as the Social Learning Theory (SLT) (LaMorte, 2019). SCT is a causational theory that explains psychosocial functioning and includes three aspects: belief strengthening (observation), improving goals (self-regulation), and competency building (reciprocal determination) (Bandura, 1988). Since its inception in 1988, the SCT has added other concepts to the framework, bringing the theory to six concepts. The six constructs are listed below in Figure 1: reciprocal determination, behavioral capability, observational learning, reinforcements, expectations, and self-efficacy (LaMorte, 2019). The SLT began with the first five concepts, and the last concept as added once the theory was renamed the SCT in 1986 (LaMorte, 2019). As the theory has improved over the years, it has given more meaning and value to the framework and how to utilize the theory in different aspects of life.

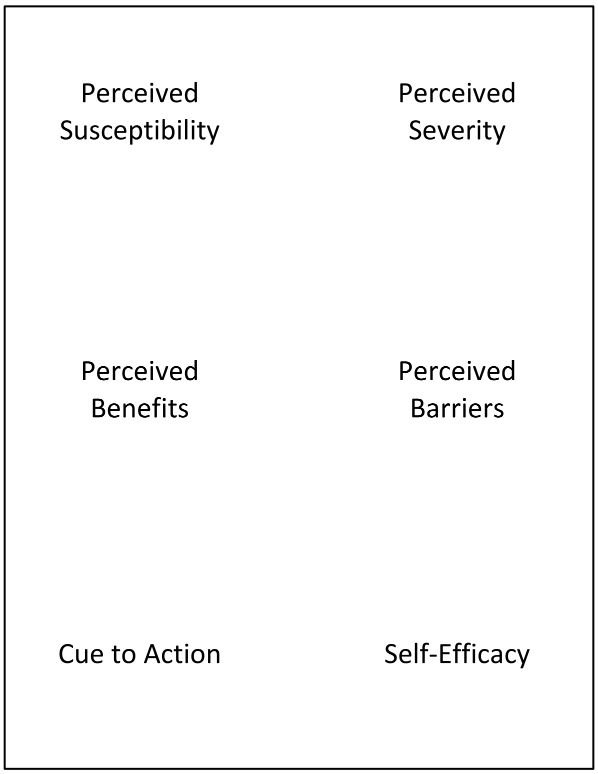
The SCT has been applied in other research areas such as clinical issues, health issues, promotional programs, and environmental change (Kelder et al., 2015). The application of this theory includes the following factors: personal cognitive factors, socio-environmental factors, and behavioral factors. The personal cognitive factors involve the following constructs, self-efficacy, knowledge, and outcome expectations (Kelder et al., 2015). The socio-environmental factors include observational learning, normative beliefs, opportunities and barriers, and social support (Kelder et al., 2015). In contrast, the behavioral factors include behavioral skills, intentions, and reinforcement & punishment (Kelder et al., 2015). The SCT is the most used theory to promote childhood obesity prevention (Alexander et al., 2021).

The purpose of using this theoretical framework in this study was to focus on the environmental and socioeconomic factors of the child and parent or guardian. The SCT shows how the child's guardian's socioeconomic factors, such as the environment, finances, education level, personal beliefs, etc., can affect the child's well-being (Alexander et al., 2021). Bandura's theory can help determine why people behave the way they do, according to their age, education level, and other socioeconomic factors (Knol et al., 2017). The theory could also provide the guardian with goal-setting support to improve the child's health. In other words, utilizing the SCT framework for this study could promote child obesity prevention.

The SCT is a vital framework and is considered one of the most used theories for published research (Kelder et al., 2015). Self-efficacy is a SCT construct that is essential for human behavioral changes by recognizing a person's confidence level (LaMorte, 2019). Due to the dependent variable, childhood obesity, each research question was applied to the first and last concept of the social cognitive theory model: reciprocal determination and self-efficacy. I operationalized the SCT in this study to examine how intellectual or physical disability had the most significant effect on childhood obesity rates in the United States. The SCT was the best framework to conduct my research because it related to the quantitative data of the child's environment, and the quantitative data of the parents' socioeconomic factors. Therefore, this model was an effective choice for this study.

Figure 1

Social Cognitive Theory Model



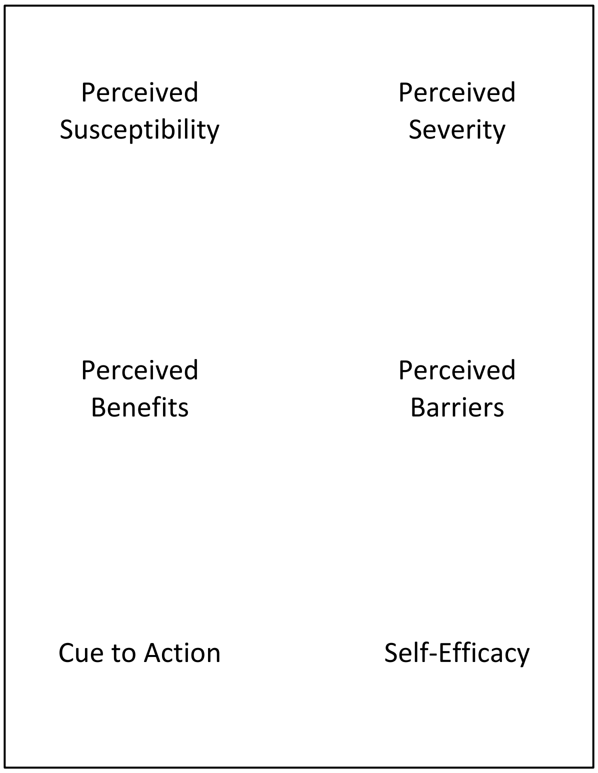
Note. (LaMorte, 2019)

Another model that was used for this study was the Health Belief Model (HBM). The six constructs of the HBM are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy, as illustrated in Figure 2 (LaMorte, 2019). The HBM helps to explain why people fail to adopt disease prevention strategies and responses to medical treatments and symptoms of an illness (LaMorte, 2019). The HBM explained the person's feelings and perceptions of their current illness, or the development of an illness (LaMorte, 2019). Lastly, the HBM stated that a person's beliefs and recommended health actions could determine whether the individual will make the behavioral changes or not.

The HBM was useful for this current study because it identified whether there is an association or relationship between the dependent variable, childhood obesity, and the confounding variables, such as the parent or guardians' income level and education level. Obesity is a complex disease, and the HBM can help to understand why some of the parents or guardians decided not to take the steps necessary to prevent this disease. I operationalized the HBM in the current study by comparing the concepts of the model to the beliefs or perceptions of the parent or guardian, which then leads to the decisions made for the child. The HBM is associated with research questions 6 and 8.

Figure 2

Health Belief Model



Note. (LaMorte, 2019)

Nature of the Study

The secondary data that were utilized in this study were archived from the National Survey of Children's Health (NSCH) with a cross-sectional research study design, which was intended to identify whether there is an association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder in children ages 0-17. The NSCH data was collected electronically or on paper via a survey (Child and Adolescent Health Measurement Initiative, 2020). The survey was compiled by the Health Resources and Services Administration's Maternal and Child Health Bureau

(HRSA MCHB) to provide data on children ages 0-17 (Child and Adolescent Health Measurement Initiative, 2020). This data included the mental, physical, and emotional health, risk factors of both the child and parent or guardian and environmental factors related to the child's well-being (Child and Adolescent Health Measurement Initiative, 2020).

There are several reasons why the dataset was utilized for this research study. The NSCH data are for public use of secondary data and are free of charge. Some data were collected at the national level, and some were collected at the state level. The independent and dependent variables that were utilized in this study were mainly collected at the national level. I chose to use the national data because they provide a broader range of data across the U.S. and because there were no state-level data available for the selected research variables for this study.

Literature Search Strategy

I used the following databases and search engines for the literature review: EBSCO, CINAHL, MEDLINE, Science Direct, Thoreau, and Google Scholar. Some key search terms used when conducting research for this study were *childhood obesity, cerebral palsy, Down Syndrome, Downs Syndrome, epilepsy, seizure disorder, social cognitive theory, health belief model, youth, obesity, overweight, children, pediatric,* and *trisomy 21.* The scope of the literature reviewed was between the years 2017-2022. The majority of the articles and research found were from peer-reviewed research. There were a few sources from textbooks, websites, and articles that either referenced Bandura or were edited by Bandura.

Literature Review

Childhood Obesity and Health Outcomes

According to Reis et al. (2020), children living in a low-income household have a 2.31% higher chance of being obese than children living in a higher income household. These researchers also found that there was no association between childhood obesity and the parents' level of education (Reis et al., 2020). In addition, children whose parents' income was less than $900 a month were at a higher risk of being overweight or obese (Bazán et al., 2018). Similarly, an article indicated that children whose parents' education level was low were at an increased risk of being overweight or obese (Bazán et al., 2018).

Socioeconomic status, race, and age have an association with childhood obesity (Banks et al., 2016). According to Banks et al.'s (2016) study of 12,674 participants in grades kindergarten to eighth grade, Black males with a higher socioeconomic status had a higher standardized body-mass index, also known as zBMI (six time points). In contrast, the White male participants with a lower socioeconomic status had lower zBMI scores. Therefore, the socioeconomic status, race, and sex of a child have a relationship with childhood obesity.

As specific to children within intellectual and physical disabilities, youth who have Down Syndrome were at a higher risk of being overweight or obese than youth without intellectual disabilities, as concluded by Oulmane et al. (2021). Also, children and adolescents who are newly diagnosed as epileptic and untreated have a higher risk of being obese (Daniels et al., 2009). Epileptic obese children are considered a comorbidity, and the relationship between the two are lack of physical activity, nutritional intake, and the medicine that they consume due to their illness (Ladino & Téllez-Zenteno, 2019). Meyns et al. (2016) conducted a study on the individualities of gait in children with cerebral palsy and their effect on body weight increase. The study concluded that more weight gain in a child is significant to the gait pattern of a child with cerebral palsy (Meyns et al., 2016). Overall, these studies support the present research by identifying some health concerns regarding childhood obesity.

Influential Factors of Childhood Obesity

Obesity has increased over the last four decades in the United States, with the childhood obesity rate at 18.5% and the adult obesity rate at 39.8% (Anderson et al., 2019). Childhood obesity is significant to discuss and study because it can lead to adult obesity (Cohut, 2017). According to the CDC, a person's weight status is determined by their BMI ratio (2021). The BMI calculates a person's weight in kilograms divided by the height in meters (CDC, 2021). The BMI of a child is calculated based on their age, is sex-specific, and is connected with direct body fat measurements (CDC, 2021). The child's percentile rate is how they are categorized. For example, an underweight child has less than the 5th percentile, a healthy weight child has between the 5th to 85th percentile, an overweight child has between the 85th to 95th percentile, and an obese child is equal to or greater than the 95th percentile (CDC, 2021).

In a study conducted by Williams et al. (2018), the researchers examined the families' risk factors for obese children between the ages of 4-5. Some of the risk factors examined were race and gender. In the study, 49.06% of the participants were females, the remaining 51% were males, over 53% were White, and over 13% were Black (Williams et al., 2018). Most of the children who had a higher prevalence rate of childhood obesity were White males between four and five (Williams et al., 2018). In a similar study, Assari (2018) examined the association between the parents' income and childhood obesity in Black and White families. The researchers used the NSCH data from 2003-2004 to determine that the incidence rate of a family's income and its association with childhood obesity did not affect Black children more than White children between the ages of 2-17 (Assari, 2018).

Lastly, Tylavsky et al. (2020) studied the environmental factors through the Environmental Influences on Child Health Outcomes (ECHO) program and their effect on childhood obesity in the United States. The ECHO program explores environmental exposures to child health and development (Tylavsky et al., 2020). In the study, ECHO was used to identify why childhood factors affect the risk of obesity (Tylavsky et al., 2020). Several factors were utilized in this study, such as the child's ethnicity, age, sex, maternal demographics, and, most importantly, the child's BMI. Children under two who participated in the study were examined according to their high BMI scores (Tylavsky et al., 2020). Children ages two-18 were examined according to their BMI, based on the following categories: overweight, obese, and severe obesity (Tylavsky et al., 2020). The researchers concluded that the child's weight increased as their age increased, while ethnicity varied (Tylavsky et al., 2020). Overall, there are several environmental factors that affect a child's weight status.

Childhood Obesity and other Countries

Childhood obesity is not only prevalent in the United States; it is also prevalent in other countries. A study was conducted between the years 2010-2014 titled The International Study of Childhood Obesity, Lifestyle, and the Environment (ISCOLE). This multi-national, observational study focused on the relationship between obesity and lifestyle factors amongst 10-year-old children residing in 12 different countries and five major regions such as North America, Africa and Eurasia, Europe, Latin America, and the Pacific (Katzmarzyk et al., 2019). The researchers compared the BMI and body fat of the children and found that the Indian boys had a more significant body fat percentage than the boys in other countries (Katzmarzyk et al., 2019). On the other hand, girls from Kenya had a lower body fat percentage than girls in other countries (Katzmarzyk et al., 2019). The BMI of girls and boys in Columbia was low, and the boys' body fat percentage was higher than the boys' in other countries (Katzmarzyk et al., 2019).

The prevalence and incidence rate of childhood obesity varies depending on many factors, including the country or region the child resides. Overall, there are several research studies that show the relationship between childhood obesity and cerebral palsy, Down Syndrome, epilepsy or seizure disorder, the child's age, race, sex, lack of physical activity and nutritional intake, environmental factors, and the education and income level of the parent.

Social and Emotional Factors Associated with Childhood Obesity

Obesity could cause several complications, such as social, emotional, and physical issues (National Institute of Diabetes and Digestive and Kidney Diseases, n.d.).

Obesity is also associated with gait disorder, obstructive sleep apnea, dyslipidemia, and hyperinsulinemia (Bertapelli et al., 2016). Children with intellectual disabilities often also suffer from anxiety and depression (Whitney et al., 2018). Additionally, childhood obesity can also cause many health-related issues, such as diabetes, breathing problems, high cholesterol, high blood pressure, and joint pain (Mayo Clinic, 2020). Current research discusses how environmental status, family beliefs, child health influences, food intake, lack of physical activity, school environment, and other related factors contributes to childhood obesity (Anderson et al., 2019). Many child behavioral risk factors could increase childhood obesity. Some factors include increased time spent watching television, playing video games, lying down or sleeping, and decreased time interacting in physical activity (Williams et al., 2018). Some studies discuss the association between childbirth and childhood obesity. Parental risk factors are another vital topic regarding childhood obesity. According to Williams et al. (2018), some parental risk factors are maternal obesity, low education, smoking, lack of nutrition knowledge, African American race, and perceived neighborhood safety.

In the study, kindergarten-aged children suffered from childhood obesity or being overweight because their parent was a smoker, and the child did not eat dinner as a family (Williams et al., 2018). Children with parents who smoked had a 40% higher chance of being overweight, while children who ate dinner with their parents had a 4% lower chance of becoming overweight (Williams et al., 2018). Overall, according to previous studies, the socioeconomic status of the parent and child is a risk factor for the child being diagnosed with childhood obesity.

In a recent article, researchers determined 10 family-related factors associated with childhood obesity. Those factors are family history of diseases, parenting styles, parental educational status, family structure, family perception about the child's weight, family meal frequency, parents' weight, occupation status, feeding practices, and parenting styles (Notara et al., 2020). These parental factors could affect the child's social, emotional, and physical well-being.

Social and emotional well-being is important in a child and young adolescent's life (Noonan & Fairclough, 2019). Their self-perception and ability to interact with other children are critical in their young lives. If the social and emotional well-being of a child is not taken care of while they are young, it could spiral into more challenging experiences in their adult lives (Noonan & Fairclough, 2019). Peer relationship problems can lead to social and emotional anxiety and later being overweight or obese in those young children and adolescents (Noonan & Fairclough, 2019). Children who are less active than other children are also more likely to develop social and emotional issues, resulting in childhood obesity (Noonan & Fiarclough, 2019).

Public Health Impact of Childhood Obesity

Childhood obesity is a public health issue raising two prime concerns: the child's physiological and psychological health. Psychological health affects the child's self-esteem and social and emotional well-being (Sanyalou et al., 2019). Children who have emotional issues such as anxiety, mood disorders, eating disorders, and somatoform are most likely children who have problems with their weight (Sanyalou et al., 2019).

Sanyalou et al.'s (2019) study showed that 60% of girls and 35% of boys indicated that they have an issue with binge eating and cannot control their eating habits.

Other public health concerns for childhood obesity are type 2 diabetes, possible diagnosis of cancer, and pulmonary disease (Sanyalou et al., 2019). These health problems are also known as chronic inflammation diseases. One or more of the listed inflammation diseases can lead to heart disease in the child's adulthood. According to Sanyalou et al.'s (2019) study, these are just a few of the reasons why it is essential for children to learn how to control their emotions and eating habits to avoid becoming overweight or obese.

As of 2020, $14 billion is spent on childhood weight health issues each year (State of Childhood Obesity, 2020). One place that we could help decrease the cost is in the education system. School districts that participate in the National School Lunch Program (NSLP) are required to provide free, drinkable, and clean water sources in their buildings (Kenney et al., 2019). Some educational institutions have decided to install water dispensers in the schools to assist with this (Kenney et al., 2019). Although the installation cost of water dispensers is between $2.74- $5.79 per child, the water jets could reach over 29 million children, prevent 179,550 childhood obesity cases, and save $0.31 per dollar in health care costs by 2025 (Kenney et al., 2019). Childhood obesity can lead to many cardiovascular and detrimental health issues that must be recognized to prevent the issue and lower the cost of this public health concern.

Prevention Efforts for Childhood Obesity

Numerous interventions have been created and implemented to prevent childhood obesity, including family-based, community-based, and school-based. Many interventions have been practiced in several countries, such as the United States, Australia, and Europe (Ash et al., 2017). Ash et al. (2017) analyzed family-based childhood obesity interventions utilizing a quantitative approach. These researchers reviewed the many family-based interventions conducted to prevent childhood obesity and concluded that there were gaps within the intervention designs and methodology (Ash et al., 2017). Their study concluded that most of the interventions conducted were mainly geared toward children ages 2-10 and less likely geared toward children ages 11-17 (Ash et al., 2017). They also concluded that more family-based interventions should be suitable for children aged 0-17 (Ash et al., 2017).

Agaronoy et al. (2018) implemented a family-based sleep promotion intervention to help prevent childhood obesity in the United States. Agaronoy et al. (2018) concluded that sleep promotion interventions should be used as a best practice to prevent childhood obesity and help infants and pre-school-aged children in high-income countries. Overall, this intervention resulted that sleep promotion can have a positive impact on a child’s behavior, such as physical activity and a healthy diet increase which can result in childhood obesity prevention (Agaronoy et al., 2018).

In a recent study, researchers evaluated a new family-based intervention based in Europe that will assist in preventing childhood obesity in school-age children (Homs et al., 2021). Homs et al. (2021) used the FItness, VAlues, and Healthy LIfestyles

(FIVALIN) project for the intervention. The FIVALIN project was put in place to help prevent childhood obesity in children ages 8-12 and follow them through adulthood (Homs et al., 2021). This intervention will address several factors associated with childhood obesity, and an evaluation will be conducted after following the child and their family for 12 months (Homs et al., 2021).

As stated above, mental health is another health issue related to childhood obesity. Narayanan et al. (2019) conducted a school-based intervention in the United States using health mentors to address childhood obesity. This intervention was used to strengthen the wellness policy in Title 1 schools by implementing a behavioral change model, Team Kid POWER! (KiPOW!) and utilizing community resources to help manage childhood obesity (Narayanan et al., 2019). The health mentors introduced the students to the importance of healthy eating and daily exercise or physical activity while at recess (Narayanan et al., 2019). After four years of implementing this intervention, researchers resulted that the KiPOW behavior change model was helpful for the students, staff, and administrators (Narayanan et al., 2019).

Also, Gadsby et al. (2020) conducted a community-based intervention on childhood obesity as a whole system approach. The Go-Golborne intervention conducted in London was created to address childhood obesity by promoting healthy lifestyles among children and families throughout the communities (Gadsby et al., 2020). The Go-Golborne campaigns and events have been successful over the years (Gadsby et al., 2020). The community believed that the children and families were beginning to make better healthy eating choices and participate in daily physical activity to decrease or prevent childhood obesity (Gadsby et al., 2020). The results showed that children who participated in the Go-Golborne intervention showed positive change and increased knowledge of healthy foods (Gadsby et al., 2020).

Another European study focused on a combination of school-based and family-based interventions to prevent childhood obesity. The study targeted interventions geared toward physical activity, dietary, and sedentary behaviors among younger children (Lambrinou et al., 2020). Some programs focused on educational sessions for parents, and others used incentives and social marketing techniques to help prevent childhood obesity (Lambrinou et al., 2020). The parent sessions were not as successful as the student incentive sessions (Lambrinou et al., 2020). After researching other childhood obesity interventions, Lambrinou et al. took those researchers' recommendations and created an intervention titled the Feel4Diabetes Intervention to assist with designing similar childhood obesity prevention proposals (Lambrinou et al., 2020). Overall, there are numerous articles about the prevention of childhood obesity and the intervention tactics researchers develop to promote prevention or decrease childhood obesity. School-based, community-based, and family-based interventions are public health tools to help prevent or decrease childhood obesity.

Childhood Obesity and Developmental Disability

Physical disability is a long-term condition that affects a specific area or area of an individual's body that limits physical functioning, dexterity, and stamina (Berg, 2020). According to the Centers for Disease Control and Prevention, cerebral palsy is the most common childhood motor disorder in the United States (CDC, 2022). Research has shown that children with cerebral palsy usually lack physical activity and cannot understand balanced food intake (Bandini et al., 2015). Bandini et al. (2015) believe that a lack of physical activity and nutritional and proportional food intake could cause children with cerebral palsy to become overweight or obese. Haegele et al. (2019) conducted a study focused on the weight status among children and youth with chronic diseases such as diabetes, intellectual disabilities, hearing impairments, Down Syndrome, epilepsy, and more based on the 2016 NSCH data. These researchers found that children with cerebral palsy were the least prevalent group considered overweight (Haegele et al., 2019).

There are two types of seizures: generalized onset and focal onset (Epilepsy Foundation, 2019). A few generalized onset seizures are atonic, absence, or tonic-clonic. (Epilepsy Foundation, 2019). The two focal onset seizures are aware seizures and impaired awareness seizures (Epilepsy Foundation, 2019). Some causes of epilepsy are stroke, head injury, brain tumor, Alzheimer’s disease, brain infection, genetic factors, and malformation of an area of the brain (Epilepsy Foundation, 2019).

Haegele et al. (2019) found that being overweight was the least prevalent among children with epilepsy. Parents of children who have epilepsy and responded to the NCHS 2016 survey were concerned that their child’s weight was too high (Haegele et al., 2019). According to Haegele et al. (2019), 13.9% of children with epilepsy were overweight but fell under the least prevalent groups to be considered overweight, according to their parents. Intellectual disabilities are significant limitations in the adaptive behavior and intellectual functioning of a person’s mental capacity that usually begins before 22 (American Association on Intellectual and Developmental Disabilities, 2021).

Physical disabilities are considered temporary or permanent limitations or disabilities that affect at least one limb in a person's body (Rutgers School of Arts and Sciences, n.d.). CP has four types: spastic cerebral palsy, spastic diplegia, spastic hemiplegia, and spastic quadriplegia (Rutgers School of Arts and Sciences, n.d.). Cerebral palsy can be considered a physical and intellectual disability because it impacts a person's ability to move around and it causes brain abnormalities (Rutgers School of Arts and Sciences, n.d.). Also, spastic quadriplegia CP affects facial features, limbs, and walking capabilities and can lead to other intellectual disabilities, such as seizures (Rutgers School of Arts and Sciences, n.d.).

Children and youth with Down Syndrome could be at a higher risk for obesity based on behavioral or physiological factors (O'Shea et al., 2018). Some behavioral factors are dietary and physical activity (O'Shea et al., 2018). Some physiological factors are low mastication, low basal metabolic rate, and hypothyroidism (O'Shea et al., 2018). O'Shea et al. (2018) used a cross-sectional approach to their study, which will also be used in my research study. According to Haegele et al. (2019), intellectual disabilities were one of the most prevalent reasons children were overweight. Because Down Syndrome was a part of the intellectual disability group in Haegele et al. (2019) study, Down Syndrome accounted for 53.6% of the children identified as overweight. The current study helps to fill the gap in the literature and spur further research in this area of obesity.

Studies Using the Proposed Methodology

The method used in this proposal is observational and quantitative. There were several studies conducted using this methodology for childhood obesity prevention. In a most recent meta-regression quantitative study, researchers studied the relationship between the outcome and dose (duration and how many sessions) of behavioral intervention trials and its association with childhood obesity (Heerman et al., 2017). The behavioral interventions were conducted in a controlled study over time between 1990 and June 2017, and the target population was children ages 2-18 years old. This study was a secondary randomized control study that identified 258 studies and used 133 studies in their meta-regression analysis (Heerman et al., 2017). The results showed no significant association between the study's covariates (Heerman et al., 2017). The results of this quantitative study did not show an association between the dose and weight-related outcomes. The researchers believed that more interventions should be conducted to prevent childhood obesity and improve healthy childhood growth (Heerman et al., 2017).

Another study observed the association between community programs and policies on a child's dietary intake to provide suggestions on facing childhood obesity. In previous research studies, nutrition was a huge factor in childhood obesity causes and prevention. Ritchie et al. (2018) examined the relationship between community policies and child nutrition in 5,138 children grades kindergarten to eighth. The conclusion of the quantitative observational study showed that if there are additional strategies included in the community program policies and more interventions conducted to control a child's limit to sugars, sweetened beverages, and energy-dense foods, it will improve children's diets (Ritchie et al., 2018). Ritchie et al. (2018) used secondary data from the observational study conducted by the Healthy Communities Study (HCS) and funded by the National Institutes of Health (NIH). This study was conducted for ten years, and interviews collected additional data. For the data to be gathered by the minor children, parents were asked to sign a consent form.

Furthermore, nutrition is important to childhood obesity awareness and prevention in children ages 5-19. Carrero-González et al. (2021) conducted a study that focused on the dietary intake habits of school-aged children who suffer from malnutrition and are considered overweight or obese. Of the 82 children who participated in the study, 21.9% of girls and 10.1% of boys were overweight, whereas obesity was more prevalent in boys at 24.5% and girls at 9.7% (Carrero-González et al., 2021). The correlational study concluded that there was a relationship between school-age children and their eating habits and weight status (Carrero-González et al., 2021). The researchers used a descriptive, correlational, and quantitative approach, which is the method that I am using in my study (Carrero-González et al., 2021). Carrero-González et al. (2021) measured the child's BMI and created a form to capture the child's date of birth, sex, weight, height, and chronological age. My study focuses on the child's race, age, sex, and weight status. Participants were provided a questionnaire to capture their food consumption. The data used in my study were also collected via a questionnaire by the primary researchers. The participants were measured based on anthropometric evaluation and classification using the nutritional diagnosis of normal weight, overweight, and obese

(Carrero-González et al., 2021). Lastly, the researchers analyzed that children ages 10-12 had overweight and obese rates of 13.89% and 74.38%, whereas children ages 12-14 had overweight and obese rates of 12.23% and 77.21% (Carrero-González et al., 2021). Each of these researchers used the quantitative method in their study. Still, they used other analyses to test their hypothesis, test if there was or was not an association between the variables, and answer their research questions.

Definitions

Body Mass Index (BMI). Calculates a person's weight in kilograms divided by the height in meters (Centers for Disease Control and Prevention, 2021).

Cerebral Palsy (CP). "A disability resulting from damage to the brain before, during, or shortly after birth and outwardly manifested by muscular incoordination and speech disturbances" (Merriam-Webster, n.d.).

Childhood Obesity. Weight over the average height and weight ratio for a child (Childhood Obesity Foundation, 2019).

Downs Syndrome (DS). "A genetic disorder caused when abnormal cell division results in an extra full or partial copy of chromosome 21. (trisomy-21)" (Mayo Clinic, n.d.).

Epilepsy. is "any of various disorders marked by abnormal electrical discharges in the brain and typically manifested by sudden, brief episodes of altered or diminished consciousness, involuntary movements, or convulsions" (Merriam-Webster, n.d.).

Socioeconomic (SES). "Relating to or involving a combination of social and economic factors" (Merriam-Webster, n.d.).

Assumptions

I assume that the process of collecting the data for the 2018-2019 National Survey of Children's Health was extensive. It is assumed that the guardians or parents of the children understood the questions from the questionnaire and responded to surveys honestly and truthfully. Another assumption is that all the children were between the ages of 0-17. I assume that the process for collecting the data was rigorous, resulting in valid data. Lastly, I assume that the original study participants received and signed an informed consent document.

Scope and Delimitations

The data used for this research study was from the 2018-2019 National Survey of Children's Health. There were 59,963 completed surveys between the two years combined, with 2018 collecting 30,530 completed surveys and 29,433 completed surveys in 2019 (Child and Adolescent Health Measurement Initiative, 2020). The population was weighted because the two years were combined and consisted of noninstitutionalized children aged 0-17 nationwide and statewide (Child and Adolescent Health Measurement Initiative, 2020). For the variables used in this research study, there were no state data available under the 2018-2019 NSCH survey. Therefore, national data were used. When finding the dataset for the selected variables, the indicators used were if the parent was "ever told that child is overweight" and the "prevalence of current or lifelong conditions" of the child.

The Social Cognitive Theory was a good model to use for the current study. The SCT was used to promote childhood obesity prevention and help identify the outcome of the study. Another model used in the current research study is the Health Belief Model. The HBM was used to discuss the relationship between the variables.

The theory considered but excluded from this study was the Theory of Planned Behavior (TPB). The TPB includes the motivational factors that consist of the reasons and actions why individuals perform certain behaviors (Kelder et al., 2015). It does not necessarily promote behavioral change through the several constructs of the framework (Kelder et al., 2015). The constructs of the SCT and HBM are fundamental in facing childhood obesity. Several other aspects of childhood obesity are essential but will not be discussed in this study, including diabetes, heart problems, autism, attention deficit hyperactivity disorder (ADHD), asthma, and more.

Limitations

Because this study is a secondary analysis of archived data, I am bound by the original study's goals, objectives, and design. I did not partake in the planning and original data collection process. I worked on the parameters of the existing database, and my analysis was limited to national data as state-level data were not collected in the original study. Another limitation is that the self-reported data were collected from the adult parents or guardians of the children. Lastly, I did not have any input on the ethical considerations for collecting, analyzing, and storing the data. There could be bias in the responses from the guardians, as some of them could have made false responses to one or more of the questions regarding the variables used for this research study. The bias could have influenced the outcomes of the study.

Significance

By studying these factors and gaining more knowledge about childhood obesity, my study might assist with a better understanding of the factors that impact childhood obesity. Children with cerebral palsy, Down Syndrome, and epilepsy or seizure disorder disabilities could lead to lack of social participation, affecting their weight levels. The lack of desire or incapability to interact socially could be detrimental to the child's weight. It is with the hope that the findings from this study help to promote positive social change in children with these specific physical and intellectual disabilities and control their weight status. Another potential social change impact of this study will be to eventually decrease morbidity and mortality associated with obesity among youth and children, especially those with physical disabilities.

Summary and Conclusion

Childhood obesity significantly affects a child's physical, social, emotional, self-esteem, and mental health (Sahoo et al., 2015). When one considers the factors of a child who has physical or intellectual disabilities, one may not connect their disability with their weight status. This study is a secondary analysis of archived data using the National Children's Health Survey database conducted between 2018 and 2019. Using the given data, I conducted a correlational study to examine the association between childhood obesity and cerebral palsy, childhood obesity and Down Syndrome, and childhood obesity and epilepsy or seizure disorder. There has been very little research conducted on some of the physical and intellectual disabilities used in this study, cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. There is a gap in research on physical disabilities (cerebral palsy) and their relationship to childhood obesity. There is also a gap in research on the association between epilepsy or seizure disorder and childhood obesity. Previous researchers recommended more research on lifestyle factors to address the risk of childhood obesity in children with intellectual disabilities (O'Shea et al., 2018).

This study has the potential to fill the gap of the researchers' recommendation. The present study filled the gap by providing data on intellectual and physical disabilities in children ages 0-17. This study identified the relationship between the dependent and independent variables using the NSCH 2018-2019 data. This study presented information to better understand some physical and intellectual disability factors associated with childhood obesity versus the other factors previously studied among youth ages 0-17. Childhood obesity is a major public health concern that will continue to be an ongoing research topic in further studies. This study opened research for future studies regarding these and other physical and intellectual disabilities and their relationship with childhood obesity or other public health issues. In section 2 of this proposal, I will explain the methodological approach thoroughly, including a comprehensive plan for data analysis.

Section 2: Research Design and Data Collection

Introduction

This cross-sectional study examined the association between obesity amongst U.S. children ages 0-17 and their diagnosis of the following physical and intellectual disabilities: cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. I used a quantitative approach. The dependent variable is childhood obesity, and the independent variables are cerebral palsy, Down Syndrome, and epilepsy and/or seizure disorder. The confounding variables are the socioeconomic status of the parent (education level and income level) and the age, race, and sex of the child. Past researchers have not combined and thoroughly studied the dependent and independent variables used in this research study together. As such, this research study filled that gap in research. Lastly, the variables utilized in this study were collected on a national level using data from the NSCH's database. No state or regional data were provided or analyzed throughout this study.

Section 2 includes a description of the research design and rationale, methodology, threats to validity, ethical procedures, and a summary of the information under the subtopics. The research design states the variables used in the study, the types of research designs used in the study, how they relate to the research questions, why the design was selected, and why choosing a design is essential to this research study. The methodology section explains the target population, sample strategy, inclusion and exclusion data information, study source and access to the dataset, power analysis for sample size, instrumentation of constructs, operationalization of the selected variables, and the data analysis plan. The threats of validity section cover the internal and external threats. The ethical procedures section includes details about the anonymity and security of the dataset, along with any other ethical processes. Lastly, the summary concludes the key points of each section.

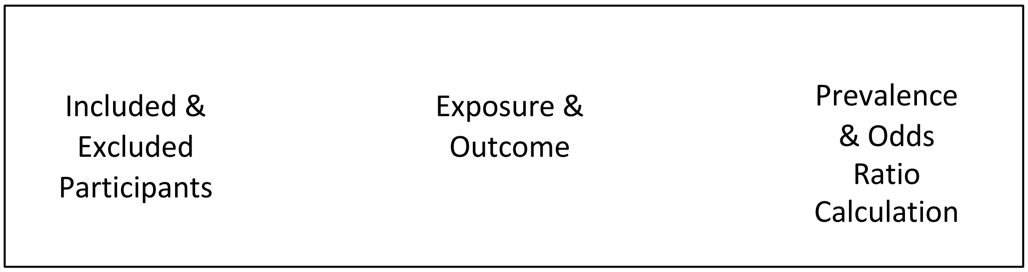
Research Design and Rationale

The research variables are childhood obesity (dependent variable), cerebral palsy (independent variable), Down Syndrome (independent variable), epilepsy and/or seizure disorder (independent variable), education level of parent or guardian (confounding variable), income level of parent or guardian (confounding variable), age of the child (confounding variable), race of the child (confounding variable), and sex of the child (confounding variable). The original data were collected and analyzed in numerical format. Therefore, this study was quantitative.

A correlational study using the cross-sectional study design examines the association between two or more variables (Seeram, 2019). The study design also identifies the outcome and exposure of the participants (Seeram, 2019). A cross-sectional study design will focus on both the internal and external data from the dataset (Seeram, 2019). Cross-sectional studies are used to study a population-based survey, calculate odds ratios (OR), and the prevalence of clinic-based studies (Seeram, 2019). The current cross-sectional study measured the OR of the archived data. An example of the order of operations for a cross-sectional study design is in Figure 3.

Figure 3

Cross-Sectional Study Design



Because a secondary dataset was used, the cross-sectional study design was the best study design option since there was no indication of temporality. As stated above, a cross-sectional study design is used for population-based surveys, and the NSCH is a population survey-designed database. Cross-sectional studies are observational study designs that help measure the outcome and exposure of the population and their association with the variables (Setia, 2016). A cross-sectional study design was used to test the research questions and determine if there was an association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. I used a sample of the data to test my hypothesis.

A cross-sectional study is also cost-efficient, but it has a lower response rate (Wang & Cheng, 2020). Another advantage of this type of study is that it is time-efficient, as the primary researchers do not follow the participants over time (Seeram, 2019; Wang & Cheng, 2020). Overall, the design choice was vital when conducting a research study like this because it allowed me to understand their study, interpret the data's outcome and exposure, and answer the research questions. It also allowed me to measure the association between the variables using the dataset.

Methodology

Data Sampling

This section describes the methodology used for this quantitative study. This section provides a brief synopsis of the original study's data collection. The NSCH's 2018-2019 survey's original data collection used a random sampling strategy to identify households with children by using a screener questionnaire. The questionnaire was mailed to the homes, and an adult who is the caretaker of the children in the household or the person who knew most about the children's health completed the survey. The adult was then given the option to complete the short screening via electronic or paper form. From the completed surveys, if there were more than four children in the household, the screeners asked additional questions about the four youngest children (Child and Adolescent Health Measurement Initiative, 2019). Once that information was collected, a child-level topical questionnaire was administered. The topical questionnaire was divided into three age groups: 0-5, 6-11, and 12-17. The adult who completed the survey for the child had to be 18 years or older, and preferably the parent of the child whose health information was being shared. Excluded participants were those 18 and above (U. S. Census Bureau, 2020).

Original Data Sampling

The National Center for Health Statistics (NCHS) is a branch of the Centers for Disease Control and Prevention (Data Resource Center for Child & Adolescent Health, n.d.). They help conduct and collect the data from the surveys (Data Resource Center for Child & Adolescent Health, n.d.). Since the NSCH began providing data on mental health, health care needs, and well-being of children ages 0-17 in the United States in 2003, the data has been used by multiple researchers (Data Resource Center for Child & Adolescent Health, n.d.). The NSCH survey was initially only conducted in 2003, 2007, and 2011/2012, but four years later, in 2016, it began to be conducted every year (Data Resource Center for Child & Adolescent Health, n.d.). Because the CDC and the Census Bureau are involved, the NSCH is a reliable source for data collection and research. The Data Resource Center for Child and Adolescent Health is responsible for cleaning and labeling the data for public exploration and use (Child and Adolescent Health Measurement Initiative, 2020).

Several instruments were used for the original data collection: web questionnaire, email questionnaire, paper questionnaire, telephone questionnaire, and Spanish language translations (U. S. Census Bureau, 2020). The U.S. Census Bureau conducted the surveys on behalf of the HRSA MCHB (U.S. Census Bureau, 2019). Once the data from the current study was cleaned, the target population sample size was determined.

Original Study Data and Target Population

In the 2018 original dataset, there were initially 176,000 households selected, but only 71,000 surveys were completed (U.S. Census Bureau, 2019). A follow-up survey was generated, and only 38,140 surveys were completed (U.S. Census Bureau, 2019). Of the 38,140 completed follow-up surveys, 30,530 households completed the interviews, which was concluded in the dataset of 30,530 participating households (U.S. Census Bureau, 2019). Table 1 illustrates the 2018 unweighted data of the original study population in the order of operation.

In the 2019 original dataset, there were initially 184,000 households selected, but only 68,500 surveys were completed (U.S. Census Bureau, 2020). Of the completed surveys, 35,760 were eligible for the follow-up questionnaire (U.S. Census Bureau, 2020). Of the eligible households, only 29,433 completed the interviews, which gave the final number of surveys that could be used for the dataset (U.S. Census Bureau, 2020). Table 2 illustrates the 2019 unweighted data of the original study population in the order of operation.

Table 1

2018 Unweighted Primary Data in Sequential Order

Data Listed in Sequential Order	Unweighted Numbers
Completed Screeners/Surveys	71,000
Screeners with Children	38,140
Completed Screeners with Children	30,530
Total Cases	176,000

Table 2

2019 Unweighted Primary Data in Sequential Order

Data Listed in Sequential Order	Unweighted Numbers
Completed Screeners/Surveys	68,500
Screeners with Children	36,196
Completed Screeners with Children	29,433
Total Cases	180,000

The target population of the original data collected was households with children ages 0-17. The total estimated population size of the NSCH 2018-2019 dataset was 356,000 cases. Of the estimated possible cases, only 286,000 were occupied households. There were 161,000 estimated responses from the targeted audience with children residing in the home. After identifying the houses that had children, the data collectors checked for completed screeners, which were a total of 139,000 cases. Once that data was collected, the number of completed screeners that included children were identified at 74,336 cases. A topical survey was sent out to 74,336 participants, and 59,963 of the topical surveys were completed. A randomized sample was conducted for this dataset, and one child from each household was included in the data. All screeners and surveys were completed by an adult in the home that knew the child best.

Access to the Dataset

The NSCH database is reputable because it has been used in many successful studies. Another reason that the NSCH data is reputable is because of its sponsors. The sponsors are as follows: The Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB), the United States (US) Census Bureau, US Department of Health and Human Services, CDC, National Center on Birth Defects and Developmental Disabilities (NCBDDD), United States Department of Agriculture (USDA), Food and Nutrition Service, and the United States Environmental Protection Agency (EPA) (2018 only) (Child and Adolescent Health Measurement Initiative, 2020). Each of these organizations is respected and heavily utilized in most health-related research. The NSCH database has a track record of collecting data. The institution has an excellent reputation, and the data is viable and collected scientifically.

The Data Resource Center for Child and Adolescent Health (DRC) has a website that provides the procedure for gaining access to the 2018-2019 NSCH survey dataset. The data query provides interactive access to the data at the national and state levels. The data query also breaks down the topics and subtopics of the children's health and demographics. The questionnaire collected all the necessary information (Child and Adolescent Health Measurement Initiative, 2020).

Because the NSCH dataset is for public use, permission to receive access to the needed codebook data was easy to obtain. The codebook was available on the Data Resource Center for Child and Adolescent Health website under the CAHMI section (Child and Adolescent Health Measurement Initiative, 2020). The Child and Adolescent Health Measurement Initiative (CAHMI) leaders ask that all who use the data keep them abreast of the publications and presentations. This data set represented the best source for my study because it provided information regarding my dependent and independent variables. Professionals and reliable organizations collected the data, and it is available for secondary use, which was important for the study.

Present Study Data Sampling and Target Population

I used all available cases in the dataset for this study (N = 59,963). The target population for the present study included children ages 0-17 who had been told they were overweight and children with cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. In 2018, there were 30,402 children between the ages of 0-17 whose guardians answered questions regarding cerebral palsy. There were 30,445 completed surveys with responses to Down Syndrome, and 30,427 completed surveys that were responded to regarding epilepsy or seizure disorder. In 2019, there were 29,323 children between the ages of 0-17 whose guardians answered questions regarding cerebral palsy. There were 29,373 completed surveys with responses to Down Syndrome, and 29,342 completed surveys that responded to epilepsy or seizure disorder. The sample size for 2018-2019 estimated totals are 59,725 for cerebral palsy, 59,818 for Down Syndrome, and 59,769 for epilepsy or seizure disorder. Table 3 illustrates the present total study population by the independent variables and year(s).

Inclusion and Exclusion

The inclusion of cases in the current study were children ages 0-17 whose parent or guardian responded to the following questions: ever being told by a healthcare professional that their child was overweight (indicator 1.4b) if the child currently has cerebral palsy (indicator 1.9a), ever told by a healthcare professional that their child has Down Syndrome (indicator 1.9b), and if the child currently has epilepsy or seizure disorder (indicator 1.9c). There were 59,719 responses to whether they were or were not ever told that their child was overweight. There were 59,707 parents or guardians that answered either yes or no on whether their child currently has cerebral palsy. There were 59,818 responses to whether their child currently has or was never told their child has Down Syndrome. There were 59,511 responses to whether their child has or does not have epilepsy or seizure disorder.

The current study focused only on the children who were told they were overweight and children who have cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. Children were excluded based on the criteria of the research questions and the purpose of the study. They were also excluded if there were responses based on ever told but do not currently have the condition. The final study sample was identified after the data was cleaned and prepared for analysis.

Table 3

Sample Size for Years (Individually and Combined) by Variables

Independent Variable	2018 Sample Size	2019 Sample Size	2018-2019 Sample Size
Cerebral Palsy	30,402	29,323	59,725
Down Syndrome	30,445	29,373	59,818
Epilepsy/Seizure Disorder	30,427	29,342	59,769
Totals	91,274	88,038	179,312

Note: Sample sizes are based on the total U.S. population and households; data includes "has," "does not have," and "never told child has condition."

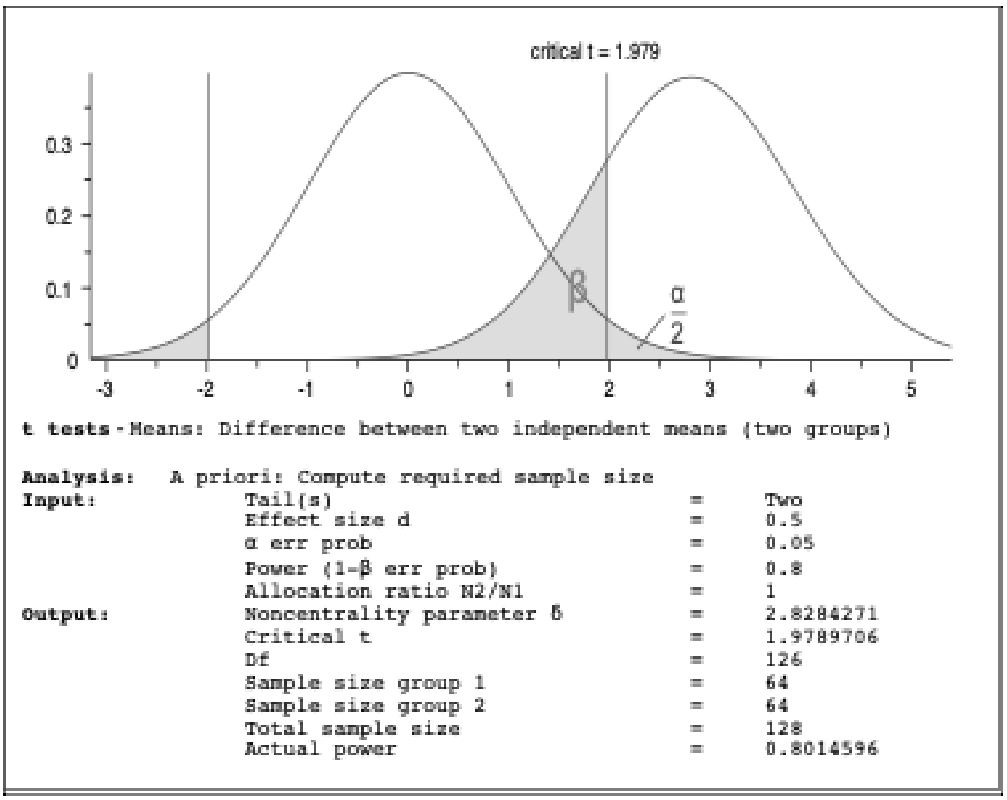
To break down the current study target population, in the NSCH 2018-2019 combined data, there is a sample count of 4,076 children who were told they were overweight. There is a sample count of 174 children who currently have cerebral palsy. There is a sample size of 104 responses stating they were told their child has Down Syndrome. Lastly, there is a sample size of 377 children who were told they currently have epilepsy or seizure disorder.

Sample Size

I used the SPSS system to analyze the uncleaned data. I sampled all available cases in the dataset. G*power was used to calculate the sample size and power analysis (Kang, 2021). When calculating the sample size using G*power, the following was used: t-test (test family), means difference between two independent means, two groups (statistical test), and a priori compute required sample size given α, power, and effect size (type of power analysis). The input parameters consisted of two tails, effect size d at 0.5 (medium), α at 0.05, power at .80, and allocation ratio N2/N1 at 1. The outcome parameters were computed to the following: Df at 126, sample size group 1 at 64, sample size group 2 at 64, total sample size at 128, and actual power at 0.8014596. Therefore, the sample size for the independent variables must be around 128 for the power to be 80%. Figure 4 illustrates the results. Given the original dataset's large sample size and the G*power test results comparing the means of two independent variables, I was confident that I would have a medium study sample after data preparation. However, after the data were cleaned, my study resulted in a small study sample size.

Figure 4

*G*power Analysis*



Post Hoc Power Analysis

The post hoc analysis is conducted after I have the sample size for the current study (Kang, 2021). I conducted a post hoc power analysis to determine the actual power of the study. Using the sample size (N), effect size, and the given α, the power level can be determined (Kang, 2021). The post hoc formula is the alpha level (α) divided by the number of tests. Post hoc analysis is known as a "statistical power 1-β and is figured as a function of significance level α, sample size, and population effect size" (Faul et al., 2009). After determination of the sample size, I reached a medium effect size (OR=3.5), an alpha level of .05, and a power of .80 to produce reliable estimates.

Data Analysis Plan

Data Preparation

There are six steps to data preparation: access the data, ingest the data, cleanse the data, format the data, combine the data, and analyze the data (Bhanot, 2021). I accessed the data from the NSCH website. I also accessed the data by reviewing other research studies that have utilized or collected data on childhood obesity, cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. Once I gained access to the necessary data, I ingested the data by using software to review the data. Although the latest package is the 28th version, the software used to analyze the data was the Statistical Package for the Social Sciences (SPSS) 27th version (IBM, n.d.). I only used the data necessary to answer my research questions.

Recoding was another helpful tool for breaking down the categories into smaller categories (Babbie, 2006). Recoding is complicated because several steps should be taken to recode the data (Babbie, 2006). If there is a random sample, the validity will be high due to there not being a specific population being targeted. Random sampling can limit the data and makes room for mistakes and additional tests. The NSCH stated that the DRC takes the results, codes them, and makes the data available to the public, making the original data collection rigorous (2022).

Data Cleaning

I used the SPSS software to clean and screen the needed data and identify the missing data and cases during the data cleaning and screening process. I checked for spelling, errors, blank cells, duplicated cells, spacing, formatting, missing cells, and number or word conversions (Bhanot, 2021). There were some missing data that were excluded from the study. The missing data and outliers depended on the values of the data. Data cleaning assisted with re-labeled cases. There were no duplicated cells within the data. Therefore, I did not highlight the cells to indicate the duplicated values. Each variable was cleaned so that I could identify the necessary data from the unnecessary data. Once I cleaned the data, I formatted the data. There were no duplicated dates, inconsistent abbreviations, or unnecessary data. After the data formation was completed, I checked for missing data and identified the missing data and cases (Bhanot, 2021). After those cases were identified as missing, I excluded the cases from the study (Bhanot, 2021). By using the preparation steps named above, I was able to analyze the data and perform tests with the cleaned dataset. The data-cleaning process was a key instrument for my research study.

Operationalization of Dependent and Independent Variables

The dependent variable, childhood obesity, was measured using the question, “Has a doctor or other health care provider ever told you that this child is overweight?” and solely on the memory of the parent or guardian. The weight status of the child was not confirmed by checking the child's weight or BMI for age (Child and Adolescent Health Measurement Initiative, 2021). In the current study, I recoded the dependent variable as 0=*no* and 1=*yes*. The independent variable cerebral palsy, was based on parent recollection and measured using the question, "Does this child currently have cerebral palsy?"; therefore, it was defined as self-reported guardian responses. I identified the responses for cerebral palsy as 1= *does not have the condition*, 2= *ever told but do not currently have the condition*, and 3= *currently have the condition*. The independent variable Down Syndrome was measured using the following question, "Does this child have Down Syndrome?" and it was also based on parent recollection; therefore, it was defined as self-reported responses. I categorized the responses for Down Syndrome as 1= *never had condition* and 2= *has condition*. The independent variable, epilepsy or seizure disorder, was measured using the question, "Does this child currently have epilepsy or a seizure disorder?" and was based on the knowledge of the parent: therefore, it was defined as self-reported responses. I identified the responses for epilepsy or seizure disorder as 1= *does not have the condition*, 2= *ever told but do not currently have the condition*, and 3= *currently have the condition*.

Operationalization of Confounding Variables

The confounding variables were the sex, age, and race of the child as well as the education and income level of the parent. Sex was measured using the question "What is the child's sex?" and was based on the parent's recollection. The variable was identified as 1= *male* and 2= *female*. Age was measured using the question "How old is this child?" with a note explaining to the parent that if the child is less than 1 month, round their age up to 1 month. The responses were given based on the parent's recollections. I categorized the responses to the age as 1= *0-5 years*, 2= *6-11 years*, and 3= *12-17 years*. Race was measured using the question "What is the child's race?" with a pro question inquiring whether the child was of Hispanic, Latino, or Spanish origin. The responses were based on the knowledge of the guardian. I identified the responses for race of the child as 1= *Hispanic*, 2= *White, Non-Hispanic*, 3= *Black, Non-Hispanic*, and 4= *Other Multiracial, Non-Hispanic*. The education level of the parent or guardian was measured using the question "What is the highest grade or level of school you have completed?" and was based on the parent's knowledge. I categorized the parent's education level as 1= *less than high school*, 2= *high school or GED*, 3= *some college or technical school*, and 4= *college degree or higher*. The final confounding variable, the income level of the parent, was measured by asking the parent what their income for the previous year was. The responses were based solely on the guardian's recollection. Based on the federal poverty level (FPL) of 2018 and 2019, the responses were categorized as 1= *0-99% FPL*, 2= *100-199% FPL*, 3= *200-399% FPL*, and 4= *400% FPL or greater*. Table 37 in Appendix T shows a visual of the breakdown of the operationalization for the dependent, independent, and confounding variables.

Research Questions

According to the NSCH 2018-2019 codebook, the child's weight status (DV) was measured by an individual item based on the parents' knowledge (Child and Adolescent Health Measurement Initiative (CAHMI) (2021). The data on the dependent variable was collected based on whether the parent or guardian was ever told by a doctor or health care professional that their child was overweight. The codebook also indicated that the child's overweight status is not verified by the child's weight or BMI per the child's age. The parent either responded yes or no.

According to the NSCH 2018-2019 codebook, the independent variables cerebral palsy, Down Syndrome, and epilepsy or seizure disorder were measured and originated from responses by the parent or guardian to the health condition question regarding 1 or more current or lifelong health conditions (Child and Adolescent Health Measurement Initiative (CAHMI) (2021). The survey question further asked if the parent or guardian was ever told by a healthcare professional or educator that the child has the condition or whether the child currently has the condition (Child and Adolescent Health Measurement Initiative (CAHMI) (2021). Additional options were, the child does not have condition, parent was told, but the child does not currently have condition and the child currently has condition (Child and Adolescent Health Measurement Initiative (CAHMI) (2021). Each independent variable was compared with the dependent variable to see if there was an association between each independent variable and the dependent variable. For the current study, the variables were measured using the SPSS 27th version. The eleven research questions and their null hypotheses (H_0) and alternative hypotheses (H_1) are as follows:

RQ1: Is there an association between childhood obesity and cerebral palsy?

$H_0$1: There is no association between childhood obesity and cerebral palsy.

$H_1$1: There is an association between childhood obesity and cerebral palsy.

RQ2: Is there an association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0$2: There is no association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

$H_1$2: There is an association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ3: Is there an association between childhood obesity and Down Syndrome?

$H_0$3: There is no association between childhood obesity and Down Syndrome.

$H_1$3: There is an association between childhood obesity and Down Syndrome.

RQ4: Is there an association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0$4: There is no association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

$H_1$4: There is an association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ5: Is there an association between childhood obesity and epilepsy or seizure disorder?

$H_0$5: There is no association between childhood obesity and epilepsy or seizure disorder.

$H_1$5: There is an association between childhood obesity and epilepsy or seizure disorder.

RQ6: Is there an association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0$6: There is no association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian and the age, race, and sex of child.

$H_1$6: There is an association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ7: Does the education level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$7: The education level of the parent or guardian does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$7: The education level of the parent or guardian does have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ8: Does the income level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$8: The income level of the parent or guardian does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$8: The income level of the parent or guardian does have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ9: Does the age of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$9: The age of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder.

$H_1$9: The age of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ10: Does the race of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$10: The race of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$10: The race of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ11: Does the sex of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$11: The sex of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$11: The sex of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

To answer each research question, I developed an analysis plan and had a clear definition of the terminology used for the study (construct validity). When constructing validity, I showed how well each test measures the perception it was intended to assess (Bhandari, 2022). I needed to understand the different terms used to identify the categories and levels of the data (Simpson, 2015). Some terms were variables, values, nominal variable, dichotomous variable, ordinal variable, categorical variables, interval variable, ratio, continuous variable, dependent variable, and independent variable (Simpson, 2015). Other terms were descriptive statistics and inferential descriptive statistics.

Descriptive Statistics

Descriptive statistics were used to describe the most common categories within my study (Simpson, 2015). I used descriptive statistics to describe the selected study population characteristics, such as the race of the child, age of the child, sex of the child, the income of the parent, and the educational level of the parent. Descriptive statistics provided the averages of the data. Descriptive statistics also include measures of central tendency, variability, and distribution to measure the data. The central tendency measures the dataset's mean, median, and mode (Guetterman, 2019). Variability measures the standard deviation, range, kurtosis, skewness, and minimum and maximum values of the dataset, and distribution measures the variations in the outcome of the data (Guetterman, 2019). I used the Chi-square test to analyze the categorical data. The Chi-square test helped to determine the correlation of the data and provided me with a p-value. The p-value then told me the significance of my test results and gave me more insight into my study population (Glen, 2022). Mock examples of descriptive statistics illustrations are in Appendices C-G. Table 17 shows the age distribution by diagnosis. Table 18 shows the race distribution by diagnosis. Table 19 shows the sex distribution by diagnosis. Table 20 shows the relationship between the prevalence of the DV and the parent's income. Table 21 indicates the relationship between the prevalence of the DV and the parent's education level.

Inferential Data Analysis

Logistic Regression

Logistic regression was the best regression analysis to use for my study because the outcome, childhood obesity (DV), is dichotomous. The outcome or dependent variable was re-coded to 0 = not obese; 1 = obese. Logistic regression was used to describe how variables were associated with the outcome and estimate the outcome of the value of the variables (Hanson, 2022). Logistic regression also described the cases' absolute and relative risk (Hanson, 2022). Lastly, logistic regression explained the relationship between the binary DV and each IV. Since the original data methodology stated that they used follow-up data, this study used logistic regression.

Assumptions of Logistic Regression

All variables in this study are categorical. The DV (childhood obesity) is a dichotomous categorical variable. The categories for childhood obesity are 'yes" or "no" and will be coded as 0= no and 1=yes. The IVs (cerebral palsy, Down Syndrome, and epilepsy or seizure disorder) are also categorical variables. Thus, logistic regression was used to examine the bivariate association between the DV and IV's. To examine whether the bivariate association remains even after controlling for confounding, multivariate logistic regression was used. Childhood obesity is the outcome variable, and the outcome variable is mutually exclusive. To test this, I examined the probability of the mutually exclusive variables. Inferential data analysis assessed the relationships between variables. By utilizing one or more tests stated above, I tested the hypothesis of each research question. Below in Table 4 is a data analysis matrix example of my research questions. For each of the research questions listed, the type of analysis was both descriptive and inferential, and the statistics used for logistic, regression, and Chi-square.

Table 4

Research Questions Data Analysis Matrix

Research Questions	Level of Analysis (Bivariate or Multivariate)
RQ1: Is there an association between childhood obesity and cerebral palsy?	Bivariate
RQ2: Is there an association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age and race of the child?	Multivariate
RQ3: Is there an association between childhood obesity and Down Syndrome?	Bivariate
RQ4: Is there an association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age and race of child?	Multivariate
RQ5: Is there an association between childhood obesity and epilepsy or seizure disorder?	Bivariate
RQ6: Is there an association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age and race of child?	Multivariate
RQ7: Does the education level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?	Multivariate
RQ8: Does the income level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?	Multivariate
RQ9: Does the age of the age child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?	Multivariate
RQ10: Does the race of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?	Multivariate
RQ11: Does the sex of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?	Multivariate

Inferential statistics are used to measure the data using the following tests: the Chi-square test, t-test, ANOVA test, ANCOVA test, correlation, and bivariate & multivariate regression tests (Guetterman, 2019). The bivariate and multivariate logistic regression tests identified the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder.

Threats to Validity

The original dataset includes merged cells based on the number of cases (U.S. Census Bureau, 2020). For instance, individual cells that housed less than 30 cases were combined with a neighboring cell (U.S. Census Bureau, 2020). Combining the cells could have caused a threat to validity. This research study examined a population of African Americans, White Americans, Hispanics, and non-Hispanics, but there is a different ethnic population, Asian non-Hispanics, that could have been a part of the combined cells mentioned above.

Ethical Procedures

As stated in the previous section, I am bound by how NSCH collected the data, and I assume the ethical procedures conducted were handled effectively and efficiently. I did not receive any raw data or analyzed data until I received IRB approval from Walden University. I did not accept or analyze any data that contained personal identifiers. I will store the data on a computer where only I have access to the password and share the information with my committee chair and members. Data and analysis will be kept for a minimum of 5 years.

Summary

The problem that was addressed in this research study is the paucity of research on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. This quantitative study aims to examine the relationship between childhood obesity and physical and intellectual disabilities among United States children ages 0-17. I used the NSCH dataset for this study. My proposed data analysis plan included bivariate and multivariate logistic regression and descriptive statistics to analyze the data and test the hypotheses. I prepared the data for analysis, including addressing missing data and outliers. I also conducted a post hoc power analysis to ascertain the final study power.

I assume that the original data collection was completed using valid and rigorous scientific methods. This study will potentially promote positive social change by increasing childhood obesity awareness and decreasing morbidity and mortality associated with obesity among youth and children. In section 3, I presented the results of the data analysis.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative study was to examine the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder while controlling for the child's age, race, and sex, as well as the income and education level of the guardian. This study also addressed the number of overweight, intellectually, and physically disabled children included in the National Survey of Children's Health 2018-2019 dataset. This study also examined the relationship between the dependent variable and independent variables, controlling for the confounding variables. I used secondary data to analyze this study. The research questions and null and alternative hypotheses are as follows.

RQ1: Is there an association between childhood obesity and cerebral palsy?

$H_0$1: There is no association between childhood obesity and cerebral palsy.

$H_1$1: There is an association between childhood obesity and cerebral palsy.

RQ2: Is there an association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0$2: There is no association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

$H_1 2$: There is an association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ3: Is there an association between childhood obesity and Down Syndrome?

$H_0 3$: There is no association between childhood obesity and Down Syndrome.

$H_1 3$: There is an association between childhood obesity and Down Syndrome.

RQ4: Is there an association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0 4$: There is no association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

$H_1 4$: There is an association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ5: Is there an association between childhood obesity and epilepsy or seizure disorder?

$H_0 5$: There is no association between childhood obesity and epilepsy or seizure disorder.

$H_1 5$: There is an association between childhood obesity and epilepsy or seizure disorder.

RQ6: Is there an association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child?

$H_0$6: There is no association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

$H_1$6: There is an association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

RQ7: Does the education level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$7: The education level of the parent or guardian does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$7: The education level of the parent or guardian does have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ8: Does the income level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$8: The income level of the parent or guardian does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$8: The income level of the parent or guardian does have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ9: Does the age of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$9: The age of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$9: The age of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ10: Does the race of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$10: The race of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$10: The race of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

RQ11: Does the sex of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_0$10: The sex of the child does not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

$H_1$10: The sex of the child has a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder?

Section 3 covers the accessibility of the original dataset, a detailed description of the statistical analysis conducted, results of the data analysis plan and a conclusion and summary of the answers to the research questions.

Accessing the Data Set for Secondary Analysis

I used archived data from The National Survey of Children's Health 2018 database. Data were collected from June 2018- January 2019 (US Census Bureau, 2019). The NSCH 2019 data were collected from June 28, 2019 to January 17, 2020 (US Census Bureau, 2020). There were multiple ways for the participants to respond: web, paper, Spanish translation, email, and telephone (US Census Bureau 2020). Of the five ways to respond, there were two data collection instruments used the most; 20.2 % of respondents utilized paper, and 78.8% of the respondents utilized the web (US Census Bureau, 2020). There were no discrepancies in the use of the dataset from the plan presented in Section 2. My study used the following demographics: age, race, and sex of the child, and the income and education level of the head of household/guardian. Included in the current dataset were children between the ages of 0-17, both male and female, and of varied races and ethnicities. The children were separated into three categories by their age at 0-5, 6-11, and 12-17. The current study had a sample of 582 children who met the criteria of the study's baseline. The study sample was determined after cleaning the data and excluding the children who were not told they were overweight and did not have or were ever told they had cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. When conducting the tests, the outcome variable (childhood obesity) was recoded as 0=No and 1=Yes. Data were analyzed between December 2022 and January 2023.

The original study conducted random sampling, so I was bound to that method as a secondary data analyst. Because random sampling was used in the original study and because I have controlling variables, my threat to validity was prevalent, which made room for mistakes and additional tests. However, being that 100% of the population of interest are children ages 0-17, the representation of the sample size was valid.

Study Sample

I originally determined that there would be a medium sample size once the original data and population size of nearly 180,000 were analyzed. When answering the research questions, the sample size decreased due to the dynamic of the research question, the controlling variables, and the moderation of the variables. Since the data has been cleaned and prepared for analysis, the sample size for this study was only 582, which is less than 1% of the total study target population. Therefore, the sample size of the current study was relatively small.

Results

Statistical Assumptions

The dependent variable was checked to make sure it was categorical, and the values were no=0 and yes=1. The independent variables were also categorical. Missing data and excluded data were removed. After the assumptions for using logistic regression were met, the findings were developed.

Descriptive Statistics

Study Sample

The independent variables, cerebral palsy, Down Syndrome and epilepsy or seizure disorder excluded the values of children who did not currently have one of the intellectual or physical disabilities, as well as those who were not overweight. According to the demographics table below (Table 5), there were 582 responses to the child's sex, race, and age, as well as the education and income level of the parent. There were 315 (54.1%) males and 267 (45.9%) females. The results also show there were 64 (11%) Hispanics, 387 (66.5%) White, 59 (10.1%) Black, and 72 (12.4%) other. The age of the children was categorized into three categories, and the results are as follows: 0-5 years at 121 (20.8%, 6-11 years at 201 (34.5%), and 12-17 years at 260 (44.7%).

This study also included the income and education level of the parents. With a total of 582 responses and four categories, the education results are as follows: less than high school 24 (4.1%), high school or GED 83 (14.3%), some college or tech school 169 (29%), and college degree or higher 306 (52.6%). With a total of 582 responses and 4 categories, the income results are as follows: 0-99% FPL 101 (17.4%), 100-199% FPL

122 (21%), 200-399% FPL 161 (27.7%), and 400% FPL or greater 198 (34%). There were a total of 575 responses to whether the child was overweight or not. There were 64 (11.2%) parents who answered yes, and 511 (87.8%) parents who answered no. Note that there were seven missing cases because they did not respond to the obesity question. Descriptive analysis was conducted using frequency tests to determine the characteristics of the study population.

Table 5

Study Population Descriptive Analysis (N=575)

Parameter		N	%
Obesity	Yes	64	11.2%
	No	511	87.8%
Sex	Male	315	54.1%
	Female	267	45.9%
Age	0-5 years	121	20.8%
	6-11 years	201	34.5%
	12-17 years	260	44.7%
Race/Ethnicity	Hispanic	64	11%
	White, Non-Hispanic	387	66.5%
	Black, Non-Hispanic	59	10.1%
	Other	72	12.4%
Education	Less than High School	24	4.1%
	High School or GED	83	14.3%
	Some College or Tech School	169	29%
	College Degree or Higher	306	12.4%
Poverty (Federal Poverty Level, FLP)	0-99%	101	17.4%
	100-199%	122	21%
	200-399%	161	27.7%
	400% or Higher	198	34%

Inferential Statistics

To test the relationship between the independent variables and dependent variable, a Chi-square, bivariate test was conducted for research questions 1-6. The p-value and Wald's analysis were used to determine if there was an association between the outcome variable and the IV's. A 3-way Chi-square test was performed to identify the relationship between the DV, IV's, and confounding variables. Logistic regression was performed to identify the odds of the IV and DV, when controlling for age, sex, and race of child, as well as the income and education level of the guardian. To identify whether the DV and IVs had a moderate effect on the confounding variables, I selected the lowest level (interaction) of each confounding variable as a reference for the modifier. This was conducted for research questions 7-11.

Research Questions & Hypotheses

Research question 1 is as follows: Is there an association between childhood obesity and cerebral palsy? The alternative hypothesis was accepted as there was an association between childhood obesity and cerebral palsy.

Research question 2 reads as follows: Is there an association between childhood obesity and cerebral palsy when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child? The alternative hypotheses were accepted as there was an association between childhood obesity and cerebral palsy, when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

Research question 3 reads as follows: Is there an association between childhood obesity and Down Syndrome? The null hypotheses were accepted as there was no association between childhood obesity and Down Syndrome.

Research question 4 reads as follows: Is there an association between childhood obesity and Down Syndrome when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child? The null hypotheses were accepted as there was not an association between childhood obesity and Down Syndrome, when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

Research question 5 reads as follows: Is there an association between childhood obesity and epilepsy or seizure disorder? The null hypotheses were accepted as there was no association between childhood obesity and epilepsy or seizure disorder.

Research question 6 reads as follows: Is there an association between childhood obesity and epilepsy or seizure disorder when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child? The alternative hypotheses were accepted as there was an association between childhood obesity and epilepsy or seizure disorder, when controlling for socioeconomic status of parent, education level of parent, income level of parent or guardian, and the age, race, and sex of child.

Research question 7 reads as follows: Does the education level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder? The null hypotheses were accepted as the education level of the parent or guardian did not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder.

Research question 8 reads as follows: Does the income level of the parent or guardian have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder? The null hypotheses were accepted as the income level of the parent or guardian did not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder.

Research question 9 reads as follows: Does the age of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder? The alternative hypotheses were accepted as the age of the child did have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder.

Research question 10 reads as follows: Does the race of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder? The null hypotheses were accepted as the race of the child did not have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder.

Research question 11 reads as follows: Does the sex of the child have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder? The alternative hypotheses were accepted as the sex of the child did have a moderation effect on the association between childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. Tables 6-15 further explain and support the findings of the hypotheses for each research question.

Chi-Square Research Questions & Findings

Data were coded and entered in the SPSS software version 27 for analysis. As previously stated, after cleaning the data and excluding some data, my sample size included 582 participants. The Chi-square test is a non-parametric test used to determine the relationships between two categorical variables; it was used to detect the association between childhood obesity and cerebral palsy (RQ1). According to table 6, the Chi-square test shows that there is a very weak association between childhood obesity and cerebral palsy (Chi-Square= 5.88, df= 1, p-value= 0.040).

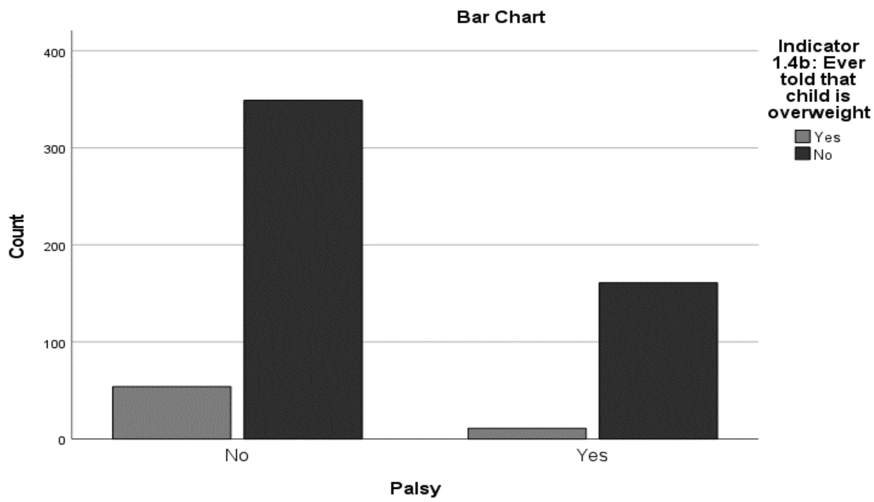
Table 6

Childhood Obesity & Cerebral Palsy (N=575)

Parameter	Chi-Square	df	p-value
Palsy	5.88	1	0.040*

Figure 5

Association Between Childhood Obesity & Cerebral Palsy



A three-way Chi Square test was conducted to detect associations between the demographics, cerebral palsy, and the outcome childhood obesity (RQ2). There were no associations between childhood obesity and cerebral palsy controlling for gender. There were no associations between childhood obesity and cerebral palsy with respect to education level of parent. There were no associations between childhood obesity and cerebral palsy with respect to income level of parent. There were no association between childhood obesity and cerebral palsy with respect to age. However, there was a weak association between a child who is overweight, has cerebral palsy, and is Hispanic (Chi-Square= 4.205, df= 1, p-value= 0.040). All other ethnicities had no association with a child who was overweight and has cerebral palsy (See Table 7).

Table 7

Childhood Obesity & Cerebral Palsy Controlling for Demographics of Child & Socioeconomic Factors of Guardian (N=575)

Parameter		Chi-Square	Df	p-value
Sex	Male	1.920	1	0.166
	Female	3.76	1	0.052
Age	0-5 years	1.12	1	0.290
	6-11 years	1.63	1	0.202
	12-17 years	3.147	1	0.076
Race/Ethnicity	Hispanic	4,205	1	0.040
	White, Non-Hispanic	1,243	1	0.215
	Black, Non-Hispanic	2.371	1	0.124
	Other, Non-Hispanic	0.304	1	0.582
Education	Less than High School	0.003	1	0.957
	High School or GED	1.773	1	0.183
	Some College or Tech School	3.361	1	0.067
	College Degree or Higher	1.509	1	0.219
Poverty (Federal Poverty Level, FLP)	0-99%	2.105	1	0.147
	100-199%	1.220	1	0.269
	200-399%	0.320	1	0.571
	400% or Higher	2.684	1	0.101

The Chi-Square test was used to detect the association between childhood obesity and down-syndrome (RQ3). There is no association between childhood obesity and Down Syndrome (Chi-Square= .217, df= 1, p-value= 0.641), as the p-value is not equal to or less than 0.05 (see table 8).

A three-way Chi Square was conducted to detect associations between the demographics, Down-Syndrome, and the outcome childhood obesity (RQ4). According to the results in table 9, there are no associations between childhood obesity and Down Syndrome with respect to gender. There are no associations between childhood obesity and Down Syndrome with respect to the race and ethnicity of the child. There are no associations between childhood obesity and Down Syndrome with respect to the age of the child. There are no associations between childhood obesity and Down Syndrome with respect to the education level of the parent or guardian. There are no associations between childhood obesity and Down Syndrome with respect to the income of parent.

Table 8

Childhood Obesity & Down Syndrome (N=575)

Parameter	Chi-Square	df	p-value
Down Syndrome	.217	1	0.641

Table 9

Childhood Obesity & Down Syndrome Controlling for Demographics of Child & Socioeconomic Factors of Guardian (N=575)

Parameter		Chi-Square	Df	p-value
Sex				
	Male	1.147	1	0.284
	Female	0.049	1	0.825
	0-5 years	0.615	1	.0433
Age				
	6-11 years	0.142	1	0.706
	12-17 years	0.008	1	0.929
Race/Ethnicity				
	Hispanic	1.147	1	0.284
	White, Non-Hispanic	0.049	1	0.825
	Black, Non-Hispanic	2.47	1	0.619
	Other, Non-Hispanic	0.004	1	0.949
Education				
	Less than High School	0.003	1	0.957
	High School or GED	1.773	1	0.183
	Some College or Tech School	3.361	1	0.067
	College Degree or Higher	1.509	1	0.219
Poverty (Federal Poverty Level, FLP)				
	0-99%	2.105	1	0.147
	100-199%	1.220	1	0.269
	200-399%	0.320	1	0.571
	400% or Higher	2.684	1	0.101

The Chi-Square test was used to detect the association between childhood obesity and epilepsy or seizure disorder (RQ5). According to the following, there is no association between childhood obesity and epilepsy or seizure disorder (Chi-Square= .612, df= 1, p-value= 0.434) as the p-value is not equal to or less than 0.05 (see table 10).

A three-way Chi Square was also conducted to detect associations between the demographics, epilepsy or seizure disorder and the outcome childhood obesity (RQ6). According to table 11, there are no associations between childhood obesity and seizure with respect to gender. There are no associations between childhood obesity and seizure with respect to education level. There are no associations between childhood obesity and seizure with respect to income of parent. There are no associations between childhood obesity and seizure with respect to age. However, there is a weak association between a child who is overweight, has epilepsy and are Hispanic (Chi-Square= 5.24, df= 1, p-value= 0.022). All other ethnicities did not have an association.

Table 10

Childhood Obesity & Epilepsy or Seizure Disorder (N=575)

Parameter	Chi-Square	df	p-value
Epilepsy or Seizure Disorder	0.612	1	0.434

Table 11

Childhood Obesity & Epilepsy or Seizure Disorder Controlling for Demographics of Child and Socioeconomic Factors of Guardian (N=575)

Parameter		Chi-Square	Df	p-value
Sex				
	Male	0.044	1	0.844
	Female	1.254	1	0.263
Age				
	0-5 years	0	1	0.983
	6-11 years	0.134	1	0.714
	12-17 years	0.580	1	0.446
Race/Ethnicity				
	Hispanic	5.24	1	0.022
	White, Non-Hispanic	1.482	1	0.224
	Black, Non-Hispanic	1.306	1	0.253
	Other, Non-Hispanic	0.640	1	0.424
Education				
	Less than High School	3.725	1	0.054
	High School or GED	0.550	1	0.458
	Some College or Tech School	0.027	1	0.869
	College Degree or Higher	0.023	1	0.879
Poverty (Federal Poverty Level, FLP)				
	0-99%	2.752	1	0.097
	100-199%	0.438	1	0.508
	200-399%	0.553	1	0.457
	400% or Higher	0.097	1	0.755

Logistic Regression Research Questions & Findings

Research questions 7-11 answer the moderation effect association between childhood obesity, cerebral palsy, Down Syndrome, and epilepsy or seizure disorder and their association with the age, sex, and race of the child, as well as the income and education level of the guardian. For research question 7, logistic regression was performed to assess the interaction term of the parent education and cerebral palsy, Down

Syndrome and epilepsy moderation effect. According to table 12, there is no moderation effect of education with cerebral palsy (Wald=0.043, p-value=0.835). The odds of childhood obesity are not statistically significant for cases of cerebral palsy. There is no moderation effect of education with Down Syndrome (Wald=1.369, p-value=0.242). The odds of childhood obesity are not statistically significant for cases of Down Syndrome. There is no moderation effect of education with epilepsy or seizure disorder (Wald=2.654, p-value=0.103). The odds of obesity are not statistically significant for cases of epilepsy or seizure disorder. Tables (19-21) in the appendix section show the moderation effect of education by each education value.

Table 12

Logistic Regression and Moderation Analysis of Education and Cerebral Palsy, Down Syndrome & Epilepsy or Seizure Disorder (N=575)

	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Interaction Education *Cerebral Palsy	.079	.379	.043	.835	.924	.439	1.944
Interaction Education *Down Syndrome	.432	.369	1.369	.242	.649	.315	1.338
Interaction Education *Epilepsy or Seizure Disorder	.541	.332	2.654	.103	1.718	.896	3.295

For research question 8, logistic regression was performed to assess the interaction term of the parents' income (poverty level) and cerebral palsy, Down Syndrome, and epilepsy moderation effect. There is no moderation effect of income with cerebral palsy (Wald=0.005, p-value=0.945). The odds of obesity are not statistically significant for cases of cerebral palsy. However, the poverty level is statistically significant compared to 0-99 FPL: poverty level 100-199 has an odds of 4.045 times 0-99 FPL (Wald=9.920, p=0.002); poverty level 200-299 has an odds of 2.311 times 0-99 FPL (Wald=5.077, p-value=0.024); poverty level of 400 FPL and over has an odds of 2.887 0-99 FPL (Wald=7.823, p-value 0.005). There is no moderation effect of income with Down Syndrome (Wald=0.498, p-value=0.480). The odds of obesity are not statistically significant for cases of Down Syndrome. However, the poverty level is statistically significant compared to 0-99 FPL: poverty level 100-199 has an odds of 4.234 times 0-99 FPL (Wald=10.74, p=0.001); poverty level 200-299 has an odds of 2.633 times 0-99 FPL (Wald=10.74, p-value=0.008); poverty level of 400 FPL and over has an odds of 3.253 0-99 FPL (Wald=9.527, p-value 0.002). There is no moderation effect of income with epilepsy or seizure disorder (Wald=2.767, p-value=0.096). The odds of obesity are not statistically significant for cases of seizure. Tables (22-24) in the appendix section show the moderation effect of income by each income value.

Table 13

Logistic Regression and Moderation Analysis of Income and Cerebral Palsy, Down Syndrome & Epilepsy or Seizure Disorder (N=575)

	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Interaction Poverty *Cerebral Palsy	-.021	.299	.005	.945	.980	.545	1.759
Interaction Poverty *Down Syndrome	-.213	.301	.498	.480	.808	.448	1.459
Interaction Poverty *Epilepsy or Seizure Disorder	.432	.260	2.767	.096	1.541	.926	2.565

For research question 9, logistic regression was performed to assess the interaction term of the child's age and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder moderation effect. Per table 14, there is no moderation effect of age with cerebral palsy (Wald=0.374, p-value=0.697). The odds of obesity are not statistically significant for cases of palsy. However, the child's age is statistically significant compared to children 0-5 years of age: Age 6-11 has an odds of .246 times ages 0-5 years (Wald=4.843, p=0.03); and Age 12-17 has an odds of 0.130 times ages 0-5 years (Wald=10.6, p=0.001). There is no moderation effect of age with Down Syndrome (Wald=0.374, p-value=0.541). The odds of obesity are not statistically significant for cases of Down Syndrome. However, the child's age is statistically significant compared to children 0-5 years of age: Age 6-11 has an odds of .242 times ages 0-5 years (Wald=4.687, p=0.03); and Age 12-17 has an odds of 0.106 times ages 0-5 years (Wald=11.39, p=0.001). There is a moderation effect of age with epilepsy or seizure disorder (Wald=2.050, p-value=0.033). The child's age is statistically significant compared to children 0-5 years of age: Age 6-11 has an odds of .272 times ages 0-5 years (Wald=4.195, p=0.041); and Age 12-17 has an odds of 0.129 times ages 0-5 years (Wald=11.3, p=0.001). Tables (25-27) in the appendix section show the moderation effect of age by each age value.

Table 14

Logistic Regression and Moderation Analysis of Age and Cerebral Palsy, Down Syndrome & Epilepsy or Seizure Disorder (N=575)

	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Interaction Age *Cerebral Palsy	-.248	.636	.151	.697	.781	.224	2.718
Interaction Age *Down Syndrome	.334	.546	.374	.541	1.396	.479	4.069
Interaction Age *Epilepsy or Seizure Disorder	.883	.617	2.050	.033	.488	.253	.944

For research question 10, logistic regression was performed to assess the interaction term of the child's race and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder moderation effect. Table 15 shows there is no moderation effect of race with cerebral palsy (Wald=0.155, p-value=0.097. The odds of obesity are not statistically significant for cases of palsy. There is no moderation effect of race with Down Syndrome (Wald=0.543, p-value=0.461). The odds of obesity are not statistically significant for cases of Down Syndrome. There is no moderation effect of race with epilepsy or seizure disorder (Wald=0.543, p-value=0.858). The odds of obesity are not statistically significant for cases of epilepsy or seizure disorder. Tables (28-30) in the appendix section show the moderation effect of race by each race value.

Table 15

Logistic Regression and Moderation Analysis of Race and Cerebral Palsy, Down Syndrome & Epilepsy or Seizure Disorder (N=575)

	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Interaction Race *Cerebral Palsy	-.309	.417	.155	.694	.849	.375	1.921
Interaction Race *Down Syndrome	-.309	.420	.543	.461	.734	.322	1.671
Interaction Race *Epilepsy or Seizure Disorder	-.309	.420	.543	.858	1.068	.522	2.185

For research question 11, logistic regression was performed to assess the interaction term of the child's sex and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder moderation effect. Table 16 shows there is a moderation effect of sex with cerebral palsy (Wald=4.768, p-value=0.29). The odds of obesity are not statistically significant for cases of cerebral palsy. However, the child's sex is not statistically significant (Wald=0.070, p=0.792). There is no moderation effect of sex with Down Syndrome (Wald=0.812, p-value=0.368). The odds of obesity are not statistically significant for cases of Down Syndrome. However, the child's sex is statistically significant compared to males: Female children have an odd of .467 times Males (Wald=6.279, p=0.012). There is a moderation effect of sex with epilepsy or seizure disorder (Wald=832, p-value=0.191). The odds of obesity are not statistically significant for cases of epilepsy or seizure disorder. However, the child's sex is not statistically significant compared to males (Wald=.316, p=0.304). Tables (31-33) in the appendix section show the moderation effect of sex by each sex value.

Table 16

Logistic Regression and Moderation Analysis of Sex and Cerebral Palsy, Down Syndrome & Epilepsy or Seizure Disorder (N=575)

	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Interaction Sex *Cerebral Palsy	-.623	.299	4.768	.029	.520	.290	.935
Interaction Sex *Down Syndrome	.603	.669	.812	.368	1.827	.492	6.781
Interaction Sex *Epilepsy or Seizure Disorder	-.525	.576	.832	.191	1.829	.191	1.829

Summary

In summary, the results show that there is a higher association between childhood obesity and epilepsy and seizure disorder, and the confounding variables than the other independent variables, cerebral palsy and Down Syndrome. Hispanic children ages 0-5, who are overweight and epileptic are at a higher risk for other races and age groups. In a recent study, being overweight was a common factor in children with intellectual disabilities at a rate of 53.6% (Haegele et al., 2019). Moreover, epileptic overweight children showed a weak significant relationship with Hispanics, age group 0-5, and males. However, children with cerebral palsy also showed a weak significant association between Hispanics and males. Understanding these aspects to this study can help to implement measures to lower or decrease childhood obesity development in Hispanic males.

Section 4 provides more information on the findings of the current study. It also provides additional details on the nature of the current study as well as limitations and recommendations for future studies and suggestions on potential social change.

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

Introduction

The purpose of this study was to examine whether there is an association between childhood obesity and the selected physical and intellectual disabilities such as cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. Childhood obesity is a public health topic that is widely discussed; however, there were a lack of studies conducted regarding the specificities of this study. Some key findings of this study indicate that there is a lack of association between childhood obesity and the independent variables, as well as the controlling variables. Bivariate logistic regression tests were conducted for research questions 1, 3, and 5, and multivariate logistic regression tests were conducted for research questions 2, 4, and 6 due to the controlling variables. Because research questions 7-11 were unique, a three-way Chi-square logistic regression test was conducted to identify the relationship between the multiple variables.

Interpretation of the Findings

Previous research showed that there was no relationship between the parent's education level and the child's weight (Reis et al., 2020). My study results also show that there was no relationship between the parent's education level and the child's weight. Previous research shows that there is a relationship between the parent's income and the child's weight status (Bazán et al., 2018). According to the current study, there is no association or moderation effect on the guardian's income level and an overweight child with a disability. Lastly, studies have shown that there is a relationship between the child's age and race and a child being overweight (Banks et al., 2016). However, my study shows that there is no relationship between the child's age, but there is a weak association between race and an overweight child with cerebral palsy.

Theoretical Framework

I used the SCT and the HBM to help interpret the findings. The SCT is a popular model used in the public health field to help understand the past experiences and behavior of the participants (LaMorte, 2019). It was critical to understand the behaviors and decisions of the guardians, as well as the children. The SCT was also helpful because it supported the expectations of a disabled child and the outcome of their actions that will affect their health. Lastly, the SCT was important to understand the observational learning from the guardian. This model includes multiple levels of an individual's behavior and past experiences, as well as how they will make changes to their behavioral health based on their social determinants of health (Rural Health Information Hub, 2018). Overall, the SCT is used to navigate behavior change interventions (Rural Health Information Hub, 2018). The SCT can support guardians who have children that are overweight and have serious health issues such as cerebral palsy and epilepsy or seizure disorder.

The HBM was important for this study because it supports the environmental and socioeconomic status of the guardians. The model includes multiple levels of psychological and behavioral capabilities of a person's perceptions about something (LaMorte, 2019). In the current study, the HBM focused on the perception of the parent's decisions for their child, based on their education level and income level, which are in research questions 6 and 8. The current study determined that there was no relationship between the socioeconomic status of the parent. That said, the perceived beliefs and knowledge, cues to action and the self-efficacy constructs of the HBM assisted in the possibility of a connection between the parent's education and income level and the child's health status.

Limitations

There were several limitations to this study. One limitation was the fact that the data could not be narrowed down to a specific state as the state data was not available. This, in term, limits the location of children. Another limitation was that the dependent variable was dichotomous. I was limited to the responses of the parents, so I do not know if they answered truthfully or not. I was limited to knowing whether the children were misdiagnosed or not. Previous studies conducted a correlational, quantitative study over a long period of time; however, because a cross-sectional study was conducted, I was limited to data collected for a short period of time. There was a large number of excluded data, which may have limited the data for the parent's education and income level, as well as the data for the sex and race of the children. I had some violations, so I can't accurately interpret the results with a high level of certainty. I did not include the parent's history of cerebral palsy, Down Syndrome or epilepsy or seizure disorder. Because I was limited to the age variable being categorical (0-5, 6-11, 12-17), there could have been a particular age or ages that were significant, or at a higher risk versus others within those categories. I also had less information with age being a categorical variable versus being a continuous variable. Lastly, there were no stress factors presented, and there was possibly a lack of resources provided to the parents/families that could have been due to the environment.

Recommendations

Based on the findings and limitations of the study, I recommend that future research be conducted on specific ages and in specific states, in relationship to children with cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. I also recommend that further research be conducted on how and why overweight Hispanic children are more prone to having cerebral palsy and epilepsy or seizure disorder. Another suggestion would be to study the socioeconomic factors of an overweight child who has cerebral palsy, Down Syndrome, and epilepsy or seizure disorder. Lastly, additional research should be conducted with epilepsy as a standalone variable and not combined with seizure disorder.

Implications for Professional Practice and Social Change

The concluding results of this study provided additional information about childhood obesity and its relationship to physical and intellectual disabilities, including socioeconomic controlling variables. From a public health professional perspective, it is critical to focus on the improvement of overweight children and decrease the childhood obesity prevalence rate of 49.7% (CDC, 2021). It is also important for health professionals to conduct more interventions with children and parents of children who have been diagnosed with cerebral palsy, Down Syndrome, epilepsy or seizure disorder, and who are overweight. Public health professionals are frontline employees who help to prevent diseases and improve the health of their communities through investigations, evaluations, and surveillance (Otto et al., 2014). I believe that the HBM is a great tool for public health professionals to help them understand and describe the perceptions of people's beliefs and behaviors regarding health issues. Public health professionals can cultivate ideas about social behaviors and what factors play a role in those social behaviors.

Based on the results of the study, childhood obesity has a connection with race, epilepsy or seizure disorder, and cerebral palsy. Children who are overweight and have been diagnosed with cerebral palsy should practice positive social change by eating healthier and doing more physical activity. Parents or guardians of children with epilepsy or seizure disorder should encourage their disabled child to take their medicine, as that could promote positive health. It is with great hope that children who suffer from one of the intellectual or physical disabilities listed in this study understand and seek the professional care they need to promote longevity.

Public health professionals can assist in positive social change amongst those living in a disabled environment by creating interventions that promote positivity that will eventually decrease mortality in children who are diagnosed as overweight or obese. Hopefully, this study shows Hispanic children and adults how important it is for them to take care of their health. Lastly, public health professionals can tackle childhood obesity and physical and intellectual disabilities through government funding, and by following all policies and procedures when creating interventions, mailings, phone calls and surveys to collect data.

Conclusion

The need for more research to be conducted on childhood obesity and cerebral palsy, Down Syndrome, and epilepsy or seizure disorder remains. My purpose was to see if there was some relationship between the outcome variable and the independent variables, as well as the controlling variables. The association between childhood obesity and cerebral palsy was faint, yet significant. The association between childhood obesity and Down Syndrome was nonexistent. The association between childhood obesity and epilepsy or seizure disorder was also nonexistent. However, there was a weak association between Hispanics who were overweight and diagnosed with cerebral palsy, as well as Hispanics who were overweight and diagnosed with epilepsy or seizure disorder. There was no moderation effect on any of the variables combined. The findings indicate that there is little to no association between childhood obesity and the physical and intellectual disabilities used in the study.

The SCT was used to examine the outcome variable and to promote childhood obesity prevention. The HBM was used to examine the health behaviors of the parents and children. Both frameworks were used to answer the research questions in this study, and to implicate the socioeconomic factors such as age, race, and sex of the child, and the income and education levels of the guardian. These United States findings may be similar to findings in other countries and may broaden the clinical research on these disabilities and children who have them. Overall, childhood obesity does not have a significant effect on children who have cerebral palsy, Down Syndrome, or epilepsy or seizure disorder; however, more research is needed to understand the environmental factors related to childhood obesity and the disabilities listed in this study.

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Appendix A: Dataset Website

The link to the data website is https://www.childhealthdata.org/learn-about-the-nsch/NSCH.

Appendix B: CITI Certificate of Training

CITI PROGRAM

Completion Date 09-Apr-2022
Expiration Date N/A
Record ID 48299600

This is to certify that:

Stephanie Swanson

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Student's
(Curriculum Group)
Doctoral Student Researchers
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Walden University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w73ff6054-883e-4ea7-be2c-2f4429d4d86e-48299600

Appendix C: Mock Table of Child's Age, Race & Sex Distributed by Diagnosis

Table 17

Study Participants' Age, Race & Sex Distribution by Diagnosis (N=x)

Age Categories	Cerebral Palsy	Down Syndrome	Epilepsy/Seizure Disorder	Total	Mean
0-4yrs					
5-8yrs					
9-12yrs					
13-17yrs					
Total					
Mean					

Race Categories	Cerebral Palsy	Down Syndrome	Epilepsy/Seizure Disorder	Total	Mean
African American					
White American					
Hispanics					
Non-Hispanics					
Total					
Mean					

Sex Categories	Cerebral Palsy	Down Syndrome	Epilepsy/Seizure Disorder	Total	Mean
Male					
Female					
Total					

Appendix D: Mock Table of Obesity Distributed by Income & Education Level of Parent

Table 18

Number of Obese Children by the Income Level and Education Level of Parent (N=x)

Childhood Obesity (yes/no)	Income Level 1 $0-20,000	Income Level 2 $20,001-40,000	Income Level 3 $40,001-60,000	Income Level 4 $60,001-80,000	P-value	Total
Yes						
No						
Total						

Childhood Obesity (yes/no)	Education Level 1 less than high school	Education Level 2 high school or GED	Education Level 3 some college or tech school	Education Level 4 college degree	P-value	Total
Yes						
No						
Total						

Appendix E: Cerebral Palsy Multivariate Logistic Regression for RQ7

Table 19

Multivariate Logistic Regression Between Cerebral Palsy and Education Level

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Cerebral Palsy (yes)	1.068	1.259	.720	.396	2.909	.247	34.280
Highest level of education among reported adults			2.126	.547			
High School	.258	.645	.160	.689	1.295	.366	4.584
Some High School	.404	.613	.435	.509	1.498	.451	4.983
College	.702	.616	1.297	.255	2.018	.603	6.751
Interaction Education *Cerebral Palsy	-.079	.379	.043	.835	.924	.439	1.944
Constant	1.358	.571	5.662	.017	3.890		

Appendix F: Down Syndrome Multivariate Logistic Regression Table for RQ7

Table 20

Multivariate Logistic Regression Between Down Syndrome and Education Level

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Down Syndrome (yes)	1.237	1.271	.947	.331	3.445	.285	41.619
Highest level of education among reported adults			3.963	.266			
High School	.486	.648	.563	.453	1.626	.456	5.794
Some High School	.615	.619	.987	.320	1.850	.550	6.228
College	1.038	.630	2.719	.099	2.825	.822	9.705
Interaction Education *Down Syndrome	-.432	.369	1.369	.242	.649	.315	1.338
Constant	1.324	.580	5.210	.022	3.759		

Appendix G: Epilepsy or Seizure Disorder Multivariate Logistic Regression Table for RQ7

Table 21

Multivariate Logistic Regression Between Epilepsy and Education Level

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Epilepsy or Seizure Disorder (yes)	-1.969	1.134	3.018	.082	.140	.015	1.287
Highest level of education among reported adults			.469	.926			
High School	-.024	.704	.001	.972	.976	.245	3.881
Some High School	-.341	.804	.180	.672	.711	.147	3.438
College	-.398	.949	.176	.675	.672	.105	4.315
Interaction Education *Epilepsy or Seizure Disorder	.541	.332	2.654	.103	1.718	.896	3.295
Constant	2.523	.852	8.773	.003	12.471		

Appendix H: Cerebral Palsy Multivariate Logistic Regression Table for RQ8

Table 22

Multivariate Logistic Regression Between Cerebral Palsy and Income Level

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Cerebral Palsy (yes)	.856	.844	1.029	.310	2.355	.450	12.315
Poverty level of this household			12.884	.005			
Poverty level of this household 100-199 FPL	1.397	.444	9.920	.002	4.045	1.695	9.650
Poverty level of this household -200-399 FPL	.838	.372	5.077	.024	2.311	1.115	4.790
Poverty level of this household – 400 and Above FPL	1.060	.379	7.823	.005	2.887	1.373	6.069
Interaction Poverty and Cerebral Palsy	-.021	.299	.005	.945	.980	.545	1.759
Constant	1.063	.263	16.273	.000	2.895		

Appendix I: Down Syndrome Multivariate Logistic Regression Table for RQ8

Table 23

Multivariate Logistic Regression Between Down Syndrome and Income Level

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Down Syndrome (yes)	.325	.910	.128	.721	1.384	.233	8.240
Poverty level of this household			15.358	.002			
Poverty level of this household 100-199 FPL	1.443	.440	10.743	.001	4.234	1.786	10.034
Poverty level of this household -200-399 FPL	.968	.363	7.112	.008	2.633	1.292	5.363
Poverty level of this household – 400 and Above FPL	1.180	.382	9.527	.002	3.253	1.538	6.879
Interaction Poverty and Down Syndrome	-.213	.301	.498	.480	.808	.448	1.459
Constant	1.226	.253	23.452	.000	3.409		

Appendix J: Epilepsy or Seizure Disorder Multivariate Logistic Regression Table for RQ8

Table 24

Multivariate Logistic Regression Between Epilepsy and Income Level

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Epilepsy or Seizure Disorder (yes)	-1.326	.784	2.862	.091	.266	.057	1.234
Poverty level of this household			5.761	.124			
Poverty level of this household 100-199 FPL	1.025	.499	4.216	.040	2.786	1.048	7.409
Poverty level of this household -200-399 FPL	.216	.550	.155	.694	1.242	.423	3.648
Poverty level of this household – 400 and Above FPL	.121	.664	.033	.855	1.129	.307	4.151
Interaction Poverty and Epilepsy or Seizure Disorder	.432	.260	2.767	.096	1.541	.926	2.565
Constant	1.931	.515	14.065	.000	6.895		

Appendix K: Cerebral Palsy Multivariate Logistic Regression Table for RQ9

Table 25

Multivariate Logistic Regression Between Cerebral Palsy and Age

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Cerebral Palsy (yes)	-1.326	.784	2.862	.091	.266	.057	1.234
Children's Age			12.223	.002			
Children's Age 6-11 years	-1.404	.638	4.843	.028	.246	.070	.858
Children's Age 12-17 years	-2.043	.628	10.600	.001	.130	.038	.443
Interaction Age *Cerebral Palsy	-.248	.636	.151	.697	.781	.224	2.718
Constant	3.453	.596	33.544	.000	31.607		

Appendix L: Down Syndrome Multivariate Logistic Regression Table for RQ9

Table 26

Multivariate Logistic Regression Between Down Syndrome and Age

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Down Syndrome (yes)	-1.009	1.424	.501	.479	.365	.022	5.948
Children’s Age			14.270	.001			
Children’s Age 6-11 years	-1.419	.656	4.684	.030	.242	.067	.875
Children's Age 12-17 years	-2.246	.668	11.297	.001	.106	.029	.392
Interaction Age *Down Syndrome	.334	.546	.374	.541	1.396	.479	4.069
Constant	3.810	.635	35.953	.000	45.156		

Appendix M: Epilepsy or Seizure Disorder Multivariate Logistic Regression Table for RQ9

Table 27

Multivariate Logistic Regression Between Epilepsy and Age

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Epilepsy or Seizure Disorder (yes)	.883	.617	2.050	.152	2.418	.722	8.100
Children's Age			15.228	.000			
Children's Age 6-11 years	-1.303	.636	4.195	.041	.272	.078	.945
Children's Age 12-17 years	-2.045	.609	11.268	.001	.129	.039	.427
Interaction Age *Epilepsy or Seizure Disorder	.883	.617	2.050	.033	.488	.253	.944
Constant	3.810	.635	35.953	.000	45.156		

Appendix N: Cerebral Palsy Multivariate Logistic Regression Table for RQ10

Table 28

Multivariate Logistic Regression Between Cerebral Palsy and Race

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Cerebral Palsy (Yes)	.389	.973	1.497	.221	3.289	.488	22.147
Race/ethnicity categories			9.135	.028			
White	.586	.403	2.612	.106	1.917	.871	4.221
Black	-.363	.511	.228	.633	.783	.288	2.133
Other	1.143	.646	2.753	.097	2.919	.824	10.343
Interaction Race *Cerebral Palsy	-.309	.417	.155	.694	.849	.375	1.921
Constant	1.673	.376	13.255	.000	3.930		

Appendix O: Down Syndrome Multivariate Logistic Regression Table for RQ10

Table 29

Multivariate Logistic Regression Between Down Syndrome and Race

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Down Syndrome (Yes)	.389	.974	.160	.689	1.476	.219	9.966
Race/ethnicity categories			9.627	.022			
White	.586	.390	2.256	.133	1.797	.836	3.862
Black	-.363	.487	.555	.456	.695	.268	1.808
Other	1.143	.680	2.826	.093	3.136	.827	11.890
Interaction Race *Down Syndrome	-.309	.420	.543	.461	.734	.322	1.671
Constant	1.673	.358	21.832	.000	5.328		

Appendix P: Epilepsy or Seizure Disorder Multivariate Logistic Regression Table for RQ10

Table 30

Multivariate Logistic Regression Between Epilepsy and Race

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Epilepsy or Seizure Disorder (Yes)	-.310	.831	.140	.709	.733	.144	3.733
Race/ethnicity categories			8.553	.034			
White	.520	.444	1.372	.241	1.683	.704	4.018
Black	-.444	.699	.404	.525	.641	.163	2.526
Other	.065	.365	.032	.376	2.223	.379	13.025
Interaction Race *Epilepsy or Seizure Disorder	-.309	.420	.543	.858	1.068	.522	2.185
Constant	1.813	.463	15.332	.000	6.127		

Appendix Q: Cerebral Palsy Multivariate Logistic Regression Table for RQ11

Table 31

Multivariate Logistic Regression Between Cerebral Palsy and Sex

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Cerebral Palsy (Yes)	.883	.467	3.576	.059	2.417	.968	6.034
Interaction Term Sex *Cerebral Palsy	-.653	.299	4.768	.029	.520	.290	.935
Sex of the child Female	-.183	.694	.070	.792	.833	.214	3.244
Constant	2.866	.498	33.128	.792	17.570		

Appendix R: Down Syndrome Multivariate Logistic Regression Table for RQ11

Table 32

Multivariate Logistic Regression Between Down Syndrome and Sex

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Down Syndrome (Yes)	-1.100	1.051	1.095	.295	.333	.042	2.612
Interaction Term Sex *Down Syndrome	.603	.669	.812	.368	1.827	.492	6.781
Sex of the child Female	-.762	.304	6.279	.012	.467	.257	.847
Constant	2.502	.239	109.963	.000	12.211		

Appendix S: Epilepsy or Seizure Disorder Multivariate Logistic Regression Table for RQ11

Table 33

Multivariate Logistic Regression Between Epilepsy and Sex

						95% C.I. for OR	
	B	S.E.	Wald	Sig.	Odds	Lower	Upper
Epilepsy or Seizure Disorder (Yes)	.613	.930	.435	.298	11.430	.298	11.430
Interaction Term Sex *Epilepsy or Seizure Disorder	-.525	.576	.832	.191	1.829	.191	1.829
Sex of the child Female	-.265	.472	.316	.304	1.933	.257	.847
Constant	2.332	.331	49.576	.000	10.300		

Appendix T: Operationalization of the Dependent, Independent, and Confounding Variables

Table 34

Operationalization of Variables

Variable Name	Variable Type	Definition	Coding Methodology
Childhood Obesity	Dependent	Based on the knowledge of the guardian	Re-coded as 0=no, 1=yes
Cerebral Palsy	Independent	Based on the knowledge of the guardian	Coded as 1= do not have the condition, 2= ever told but do not currently have the condition, and 3= currently have the condition
Down Syndrome	Independent	Based on the knowledge of the guardian	Coded as 1= never had condition and 2= has condition
Epilepsy or Seizure Disorder	Independent	Based on the knowledge of the guardian	Coded as 1= do not have the condition, 2= ever told but do not currently have the condition, and 3= currently have the condition
Sex	Confounding	Base on the knowledge of the guardian	Coded as 1=male, 2= female
Age	Confounding	Based on the knowledge of the guardian	Coded as 1= 0-5 years, 2= 6-11 years, and 3= 12-17 years
Race	Confounding	Based on the knowledge of the guardian	Coded as 1= Hispanic, 2= White, Non-Hispanic, 3= Black, Non-Hispanic, and 4= Other multiracial, Non-Hispanic
Education Level	Confounding		Coded as 1= less than high school, 2= high school or GED, 3= some college or technical school, and 4= college degree or higher

		Based on the knowledge of the guardian	Coded as 1= 0-99% FPL, 2= 100-199% FPL, 3= 200-399% FPL, and 4= 400% FPL or greater
Income Level	Confounding	Based on the knowledge of the guardian	